ATTACHMENT 1

FACILITY DESCRIPTION

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LIST OF ACRONYMS

BCS	Bulk Chemical Storage
BRA	Brine Reduction Area
CAL	Chemical Assessment Laboratory
CAMDS	Chemical Agent Munitions Disposal System
CFR	Code of Federal Regulations
CHB	Container Handling Building
CSB	Communication Switch Building
CSDP	Chemical Stockpile Disposal Program
CWC	Chemical Weapons Convention
DCD	Deseret Chemical Depot
DFS	Deactivation Furnace System
ECF	Entry Control Facility
GB	Sarin, Isopropyl methylphosphonofluoridate
H/HD/HT	Sulfur Mustard[1] /Distilled Sulfur Mustard/Distilled Mustard with 40% Bis-[2-(2-chloroethylthio)-ethyl] ether
HVAC	Heating, Ventilation, Air Conditioning
JACADS	Johnston Atoll Chemical Agent Disposal System
LIC	Liquid Incinerator
LPG	Liquefied Petroleum Gas
MDB	Munitions Demilitarization Building
MSB	Monitor Support Building
MPF	Metal Parts Furnace
NDAA	National Defense Authorization Act
NFPA	National Fire Protection Association
OSIA	On Site Inspection Agency
PAS	Pollution Abatement System
PMB	Personnel Maintenance Building
PMCD	Program Manager for Chemical Demilitarization
POT	Potable Water System
PRW	Process Water System
PSB	Personnel Support Building
PUB	Process and Utility Building
SWMU	Solid Waste Management Unit
T	Bis-[2-(2-chloroethylthio)-ethyl] ether
TCB	Treaty Compliance Building
TMA	Toxic Maintenance Area
TOCDF	Tooele Chemical Agent Disposal Facility
UPA	Unpack Area
VX	O-ethyl-S-(2-diisopropylaminoethyl) methyl phosphonothiolate
WTS	Water Treatment System

Deleted: PAS
Deleted: Pollution Abatement System
Deleted: DUN Dunnage Incinerator
Deleted: NFPA National Fire Protection Association¶
Deleted: bis 2-Chloroethylthioethylester
Deleted: Liquified
Deleted: ropane

[1] Sulfur Mustard = Bis(2-Chloroethyl) Sulfide or 2.2' Dichlorodiethyl Sulfide

1.1 GENERAL DESCRIPTION [R315-3-2.5(b)(1)]

1.1.1 Introduction

1.1.1.1 The Tooele Chemical Agent Disposal Facility (TOCDF) is a multi-incinerator hazardous waste treatment and storage facility located within the federally owned Deseret Chemical Depot (DCD).

1.1.1.2 The TOCDF is designed and constructed for the treatment of the chemical agents and munitions stockpile currently stored at the DCD Area 10 (a.k.a. Chemical Munitions Storage Area). Area 10 is immediately adjacent and physically connected to the northern end of the TOCDF.

1.1.2 Facility Location and Setting

1.1.2.1 DCD is located in the State of Utah and covers about 7,900 hectares and is located approximately 26 kilometers (16 miles) south of the City of Tooele, off State Highway 36 at latitude 40° 18' 00" North and longitude 112° 20' 00" West. DCD is located approximately 56 kilometers (35 miles) southwest of Salt Lake City, approximately 48 kilometers (30 miles) south of the Great Salt Lake, approximately 48 kilometers (30 miles) west of Utah Lake, and approximately 61 kilometers (38 miles) west of the city of Provo. Figure 1-1[2] shows the location of the DCD in the Rush Valley of Tooele County and its relation to the other towns, cities, and geographic landmarks in the area. The location of the TOCDF lies within the DCD installation boundaries as shown in Drawing TE-16-C-2.[3]

1.1.2.2 DCD is generally rectangular in shape: approximately 6.5 miles in length (east-west) and 5 miles in width (north-south) and comprises 19,364 acres. Several types of chemical agents are stored at DCD in a variety of ammunition configurations, including spray tanks, ton containers, bombs, projectiles, mortars, rockets, and mines. These munitions are stored in Area 10.

1.1.2.3 The processing area at the TOCDF, which is enclosed by a security fence, is comprised of approximately 40 acres. The distance from TOCDF demilitarization site to the nearest DCD boundary (due north) is approximately 2 miles.

1.1.2.4 There are four TOCDF-operated facilities, in addition to the TOCDF plant, on the DCD installation:

1.1.2.4.1 The administration building located at 11600 Stark Road, approximately 3 miles northeast of the TOCDF. This building houses administrative offices only.

1.1.2.4.2 The Chemical Assessment Laboratory (CAL). This facility is located approximately 1.5 miles southwest of the TOCDF. The CAL has laboratory quantities of chemicals and

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[2] All figures are addressed at the end of this attachment.

[3] All drawings are addressed in Attachment 11.

neat and dilute solutions of chemical agents on location, but not in quantities sufficient to pose a danger to persons or the environment beyond the boundaries of the lab.

1.1.2.4.3 The area known as Area 2 contains a number of warehouses. TOCDF controls eight of the warehouses in Area 2. These warehouses are used for storage of various items such as office furniture, tools, brick, product chemicals, and construction materials. Warehouses used by TOCDF are buildings 4001, 4002, 4012, 4057, 4058, 4108, 4109, and 4110. TOCDF may use other buildings for the storage of material and equipment. Area 2 is located approximately 2 miles east-southeast of the TOCDF.

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1.1.2.4.4 The Transfer Yard is located approximately 1.5 miles east/northeast of the TOCDF.

1.1.3 Chemical Weapons Destruction Program Overview

1.1.3.1 The U.S. Army maintains a stockpile of chemical agents and munitions for the Department of Defense. This stockpile was established to deter other countries from using chemical weapons on U.S. or allied troops. In 1968, the U.S. stopped manufacturing chemical weapons. The stockpile is no longer deemed necessary for national security.

1.1.3.2 In November 1985, the U.S. Congress approved the Department of Defense Authorization Act (Public Law 99-145) which directed and authorized the destruction of 90 % of the total U.S. stockpile of unitary chemical munitions and agents by 30 September 1994.

1.1.3.3 The Act was first amended on 15 March 1988 when the Army submitted the Chemical Stockpile Disposal Program (CSDP) implementation plan to Congress in which the deadline for destruction of the unitary chemical weapons stockpile was extended to 30 April 1997. This amendment also allowed more full-scale testing of the Johnston Atoll Chemical Agent Disposal System (JACADS) facility.

1.1.3.4 On 28 October 1992, the National Defense Authorization Act (NDAA) for fiscal year 1993 directed the Army to dispose of the entire unitary chemical weapons stockpile by 31 December 2004. The NDAA supersedes Public Law 99-145.

1.1.3.5 In April 1997, the Chemical Weapons Convention (CWC) was ratified by the United States and supersedes the NDAA. The CWC indicates that destruction of the unitary chemical weapons stockpile must be complete not later than 10 years after entry into force of this Convention (i.e., the year April 2007).

1.1.3.6 Chemical weapons are stored at eight separate sites throughout the continental United States, including the DCD.[4] At the beginning of agent destruction activities in 1996, DCD had the largest portion of the nation's chemical agent stockpile. Table 1-1 shows the makeup of the original stockpile that was to be destroyed at TOCDF.

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[4] The seven other sites are: Pine Bluff Chemical Activity, Arkansas; Anniston Chemical Activity, Alabama; Umatilla Chemical Depot, Oregon; Newport Chemical Depot, Indiana; Edgewood Chemical Activity (Aberdeen Proving Ground), Maryland; Blue Grass Chemical Activity, Kentucky; and Pueblo Chemical Depot, Colorado.

Table 1-1
ORIGINAL STOCKPILE OF CHEMICAL WEAPONS TO BE DESTROYED AT TOCDF

Agent	Item	Quantity[5]	Pounds[5]
HT-Blister	4.2" Mortars	62,590	363,020
HD-Blister	4.2" Mortars	976	5,860
	Ton Containers	6,398	11,383,420
H-Blister	155mm Projectiles	54,663	639,540
GB-Nerve	105mm Cartridges	119,400	194,620
	105mm Projectiles	679,303	1,107,260
	M55 Rockets	28,945	309,720
	M56 Rocket Warheads	1,066	11,406
	155mm Projectiles	89,141	579,417
	MK-116 Bombs	888	308,140
	MC-1 Bombs	4,463	981,860
	Ton Containers	5,709	8,598,200
VX-Nerve	155mm Projectiles	53,216	319,300
	M23 Land Mines	22,690	238,240
	M55 Rockets	3,966	39,660
	M56 Rocket Warheads	3,560	35,600
	TMU-28 Spray Tanks	862	1,168,880
	Ton Containers	640	910,960

1.1.3.7 The DCD stockpile of chemical agents includes organophosphate nerve agents and blister agents as listed below:

1.1.3.7.1 nerve agent VX

1.1.3.7.2 nerve agent Sarin (GB)

1.1.3.7.3 blister agents mustard (H, HD, and HT).

1.1.3.8 Information on chemical agent characteristics are briefly described in Table 1-2.

[5] The Army's Chemical Stockpile Disposal Program began destroying the chemical stockpile at the TOCDF in August 1996. These numbers do not reflect chemical weapons destroyed since operations began. As of June 2005, all bulk containers and munitions containing VX and GB nerve agents have been eliminated from the stockpile.

Table 1-2 CHEMICAL AGENTS TO BE DESTROYED AT TOCDF	
Agent	**Description**
GB	GB (Sarin) is a rapid-acting nerve agent. The action within the body is the inactivation of cholinesterase. The hazard from GB is that of vapor absorption through the respiratory tract, although it can be absorbed through any part of the skin, through the eyes, and through the gastrointestinal tract by ingestion. The agent absorption rate is accelerated through cuts and abrasions in the skin. When dispersed as large droplets, GB is moderately persistent; it is nonpersistent when disseminated as a cloud of very fine particles.
VX	VX is a rapid-acting nerve agent. The action within the body is the inactivation of cholinesterase. The hazard from VX is primarily that of liquid absorption through the skin, although it can be absorbed through the respiratory tract as a vapor or aerosol, and through the gastrointestinal tract by ingestion. VX is slow to evaporate and may persist as a liquid for several days.
Mustard	Mustard is a persistent and powerful blister agent. It acts principally by poisoning the cells in the surfaces contacted. Both liquid and vapor cause intense inflammation and may cause severe blistering of both the skin and mucous membranes. Mustard is only moderately volatile. Mustard is designated H, HD, and HT. H is mustard made by the Levinstein process. It contains up to 25 percent by weight of impurities, chiefly sulfur, organosulfur, and polysulfides. HD (distilled mustard) is mustard purified by washing and vacuum distillation, which reduces the impurities to about 5 percent. HT is a 60:40 mixture by weight of HD and T. T is an abbreviation for Bis-[2-(2-chloroethylthio)-ethyl] ether.

1.1.3.9 The chemical agents are stored at the DCD Area 10.[6] The chemical agents are contained in rockets, land mines, mortars, artillery projectiles and cartridges, bombs, spray tanks, and ton containers. Information on the munitions and bulk items is summarized in Table 1-3.

[6] Area 10 is permitted under a separate part B permit and administered by DCD.

Table 1-3 COMPOSITION OF MUNITIONS AND BULK ITEMS					
Munition	**Agent**	**Fuse**	**Burster**	**Propellant**	**Dunnag**
M55 115mm rockets[7]	GB, VX	Yes	Yes	Yes	Yes
M23 land mines	VX	Yes	Yes	No	Yes
4.2 in. mortars	HD, HT	Yes	Yes	Yes	Yes
105-mm cartridges	GB	Yes	Yes	Yes	Yes
105-mm projectiles	GB	No	No	No	Yes
155-mm projectiles	GB, VX, H	No	Yes[8]	No	Yes
Bombs (525 & 750 lb)	GB	No	No	No	Yes
Spray tanks	VX	No	No	No	No
Ton Containers	GB, VX, H,	No	No	No	No

1.1.4 **Chemical Agent Demilitarization Process Overview**

1.1.4.1 The TOCDF system involves reverse assembly of chemical agent-filled munitions and includes four incinerators for agent destruction.

1.1.4.2 Figure 1-2 presents a simplified flow diagram of the incineration treatment processes followed at the TOCDF. The treatment processes are based on the destruction of chemical agents and energetic materials by incineration. The primary processes employed at the plant and simplified TOCDF layout is briefly discussed below.

1.1.4.3 Munitions Processing

1.1.4.3.1 The munitions processing at the TOCDF includes initial separation of explosives and draining of the chemical agent. The Deactivation Furnace System (DFS) processes drained rockets and mines as well as explosives and propellants removed from mortars, cartridges and projectiles. The Metal Parts Furnace (MPF) thermally decontaminates all drained bulk items, projectiles, and mortars from which the energetic components have been removed.

1.1.4.4 Agent Processing

1.1.4.4.1 The drained chemical agents GB, VX, and mustard from bulk items and munitions are burned in the Liquid Incinerators (LICs), along with spent decontamination solution and miscellaneous waste liquids.

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[7] M55 rockets are processed in individual fiberglass shipping containers.

[8] While the majority of these items contain bursters, some are stored without these components.

1.1.4.5 Pollution Abatement System

1.1.4.5.1 The flue gases from the DFS, MPF, and LICs are treated via separate wet Pollution Abatement Systems (PAS). The scrubber liquid (brine) from the wet scrubbers is pumped to storage tanks and either fed to dryers to reduce the brine to a salt or transported off site for treatment and disposal.

1.1.4.6 Plant Operation

1.1.4.6.1 The TOCDF is operated 24 hours per day, 7 days per week, and 52 weeks per year. Personnel are at the site at all times.

1.1.5 **Hazardous Waste Disposal/Generation**

1.1.5.1 Chemical Agents and Munitions

1.1.5.1.1 When the munitions or bulk agents are delivered to the TOCDF from Area 10, the physical and accounting responsibility is transferred from the storage account managed by the DCD commander to a demilitarization account managed by the TOCDF Site Project Manager, and the items are removed from the Army's inventory of chemical munitions. At this point, all bulk items and munitions will be classified as a hazardous waste. (Only the M55 rockets have previously been designated as a hazardous waste.) Agents GB, VX, and the mustard agents are classified as a hazardous waste by the State of Utah.

1.1.5.2 Potentially Hazardous Wastes Generated at the TOCDF

1.1.5.2.1 In addition to chemical agent and munition wastes, there are potentially hazardous wastes generated during TOCDF operations that may require either interim storage, further on-site treatment, or shipment off site to an approved hazardous waste management facility. Waste streams generated at the TOCDF are described in detail in the Attachment 2 (Waste Analysis Plan). These wastes include but are not limited to:

1.1.5.2.1.1 The brine generated from the incinerator pollution abatement system.

1.1.5.2.1.2 Salts formed by treatment of the brine.

1.1.5.2.1.3 Dry residues and ash collected from the DFS.

1.1.5.2.1.4 Ash from the operation of the MPF.

1.1.5.2.1.5 Ventilation system filters.

1.1.5.2.1.6 Monitoring support and laboratory wastes generated from onsite chemical analysis.

1.1.5.2.1.7 Spent Decontamination Solution.

1.1.5.3 RCRA Hazardous Waste Treatment and Storage Units that are Permitted

1.1.5.3.1 The hazardous waste management (process) systems consist of Container Storage, Tank Storage, Treatment in Tanks, Liquid Injection Incineration, Rotary Kiln Incineration, Multiple Hearth Incineration, Treatment In and Using Miscellaneous Treatment Units. Treatment codes are referenced in R315-50-2.

1.1.5.3.2 The incinerators are classified as hazardous waste incinerators because they are enclosed devices that use controlled flame combustion to thermally break down hazardous waste. The containers hold explosives, propellants, the various agents (e.g., ton containers and other items of equipment that contain these materials), and brine salts and dry residues from combustion. The storage of chemical agents, explosives, and propellants in the munitions and bulk items are addressed as container storage with regard to the hazardous waste regulations.

1.1.5.3.3 Chemical and physical characteristics of the chemical agents, propellants, and explosives are described in the Attachment 2 (Waste Analysis Plan). Tanks hold agent, spent decontamination solution, brine, and miscellaneous liquids listed in Module IV.

1.2 <u>TOPOGRAPHIC MAP [R315-3-2.5(b)(19)]</u>

1.2.1 <u>General</u>

1.2.1.1 The following drawings and figures are used to satisfy specific facility description requirements:

1.2.1.1.1	TE-16-C-2	Overall Site Plan & Vicinity Map
1.2.1.1.2	TE-16-C-3	Topographic Map (restricted access - protected record)
1.2.1.1.3	TE-16-C-4	Site Work Area 1 Plot Plan
1.2.1.1.4	TE-16-C-5	Site Work Area 2 Plot Plan
1.2.1.1.5	TE-16-C-6	Site Work Area 3 Plot Plan
1.2.1.1.6	EG-16-C-7402	Site Work Storm Drain Plan
1.2.1.1.7	TE-22-C-10	Sewage Lagoon Site & Grading Plan
1.2.1.1.8	TE-22-C-13	Reservoir Site and Grading Plan
1.2.1.1.9	Figure 1-1	Location of Deseret Chemical Depot
1.2.1.1.10	Figure 1-3	Approximate Groundwater Monitor Well Location

1.2.1.2 Drawing TE-16-C-3 (restricted access - protected record) is a Topographic Map of the TOCDF site and includes the local surrounding area to a distance of at least 1,000 feet from the site perimeter. Map scale is 1 inch equals 100 feet and the contour interval is 5 feet.

1.2.2 <u>Map Scale and Date</u>

1.2.2.1 The current revision and date of each drawing is indicated in the lower right-hand title block. The current date of each drawing is indicated in the lower right-hand corner. Likewise the scale of each map is shown.

1.2.2.2 Drawings TE-16-C-2 and TE-16-C-3 are drawn to a scale of 1 inch equals 100 feet. The DCD portion of Drawing TE-16-C-3 is drawn to a scale of 1-inch equals 2500 feet.

1.2.3 <u>100-Year Flood Plain</u>

1.2.3.1 The DCD has not been mapped for the National Flood Insurance Program and thus there are no 100-year floodplain maps for the installation. The floodplain standard is discussed in further detail in section 1.3.2.

1.2.4 **Surface Waters**

1.2.4.1 The TOCDF site at the DCD is located at an elevation (approximately 5170 feet)[9] overlooking a relatively flat and arid lowland basin known as Rush Valley. The TOCDF buildings are approximately 140 feet higher in elevation than the valley floor and more than 7,000 feet horizontally distant.[10]

1.2.4.2 Water-related features pertinent to the TOCDF site are minor in importance, primarily because of their absence. Surface waters in Rush Valley include Rush Lake, Faust Creek and Reservoir, Vernon Creek and Reservoir, Ophir Creek, Clover Creek, and shallow ponds east of the town of Rush Valley. Several seasonal small streams, which originate in the Oquirrh, Stansbury, Onaqui, Tintic, and Sheeprock Mountains, disappear on the dry Rush Valley floor. No surface waters leave the valley. Runoff in Tooele Valley, which lies north of Rush Valley, drains to the northwest and into the Great Salt Lake. Most groundwater recharge occurs through infiltration of precipitation in the mountains, and to a lesser degree, from stream recharge and irrigation. The topography of the drainage basin is generally smooth and uniform, sloping to the west from the TOCDF to the Rush Valley floor. The valley floor drains to Rush Lake, which is located approximately 11 miles northwest from the TOCDF.[11]

1.2.4.3 The 460-square mile Rush Valley drainage basin is characterized as having poorly drained alkaline soils of moderately consolidated and unconsolidated layers of sand, gravel, silt, and clay.[12] Nevertheless, floods do not occur because of the arid climate and the storm water drainage system installed at the TOCDF. The lack of intermittent

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[9] Precise TOCDF site brass cap monument elevation markers are indicated on Drawings TE-16-C-5 and TE-16-C-6.

[10] The brass cap monument markers located on the commercial railway due west of the TOCDF indicate an elevation of 5030 feet. (United States Geological Survey, Saint John Quadrangle, edited 1993).

[11] The elevation of Rush Lake is estimated to be approximately 5000 feet. See Figure 1-1 for the location of Rush Lake and mountain ranges.

[12] The Rush Valley is an elongated, north-south oriented, intermountain basin located between the Oquirrh Mountains to the east, the Stansbury and Onaqui Mountains to the west, and the Shiprock Mountains to the south. Rush Valley is located in the eastern Basin and Range physiographic province and is representative of intermountain basins within the province. Rush Valley is partially filled with alluvial sediments and lake beds. Geologic formations in the vicinity consist of Paleozoic sedimentary rock, along with gravel, sand, and clay. The TOCDF is located near the base of the Oquirrh Mountains, where the land surface consists of relatively porous colluvial and alluvial deposits containing sand and gravel, with some conglomerate and clay.

streams or defined flow paths in the valley confirms the lack of flooding potential. The elevation of the TOCDF above the valley floor further protects it from flood threats.

1.2.5 **Surrounding Land Uses**

1.2.5.1 The location of the TOCDF within the DCD installation boundaries is shown on Drawing TE-16-C-2. Also located on DCD property are the Chemical Agent Munitions Disposal System (CAMDS) facility, the CAL and associated TOCDF operated facilities described in 1.1.2.3. DCD and the CAMDS facility operate separately and independently of the TOCDF and are not addressed in this document, whereas the CAL plays an integral part in TOCDF demilitarization operations. DCD also oversees other activities that relate to the overall operation of the Depot. Other areas within DCD are open range and are controlled by the military. The majority of the land surrounding DCD is likewise federally owned.

1.2.5.2 Much of the 6,919 square mile Tooele County, where DCD is located, is sparsely populated. DCD was constructed in 1942 in Rush Valley. Originally, DCD was a relatively remote area, accessible only by a railroad that was used for collection and distribution of munitions. Access to Rush Valley is possible on State Highway 36 from the north and State Highway 73 from the east.

1.2.5.3 Year 2000 population figures estimate the population for all of Tooele County at approximately 40,000. Presently, the majority of the county's population is concentrated north of the South Mountain geologic land formation, which separates Rush Valley from Tooele Valley.[13]

1.2.5.4 A few small communities, including Stockton, Rush Valley, and Ophir, ranches, and mines are located between a 10-kilometer to 25-kilometer (6-mile to 15-mile) radius of the TOCDF. No city or town lies within 10 kilometers (6 miles) of the TOCDF.

1.2.5.5 Land use outside the DCD is dominated by livestock grazing. Beef cattle leads as the primary livestock, followed by sheep.

1.2.5.6 Cropland accounts for only a minute fraction of the agricultural land use around DCD. Only 2.9% of the Rush Valley Basin has been cultivated for growing crops. Crops grown in the area include wheat, barley, corn, oats, and alfalfa. Since rainfall in the valley is limited, irrigation is a common practice among the agricultural sector. Water is obtained from nearby streams and water storage reservoirs.

1.2.6 **Wind Rose**

1.2.6.1 The wind rose for the TOCDF is included on Drawing TE-16-C-3 (restricted access - protected record). The wind rose plot is from data collected at the DCD weather station located in Building 5108 and reflects 1997-year end data from Weather Station 9. The prevailing winds at the TOCDF area follow the orientation of the mountain ranges

[13] Year-end population estimates are as provided by Utah Department of Workforce Services.

flanking either side of the facility.[14] Winds are prevalent from the south through southeast in the summer and from the north through northwest in the winter.

1.2.7 **Map Orientation**

1.2.7.1 All drawings referenced in Paragraph 1.2.1 have a north arrow direction indicator.

1.2.8 **Legal Boundaries of the Facility**

1.2.8.1 Drawing TE-16-C-2 shows the legal boundaries of the TOCDF. The legal boundaries of the TOCDF are defined as the area enclosed by the outer security fence and the portion of the existing fence along Heart Street that connects the TOCDF to Area 10 perimeter fence. The only waste management units in the immediate vicinity of the TOCDF plant are those units located at the facility itself.

1.2.9 **Access Control**

1.2.9.1 Access to the DCD is via County Road 198, connecting State Highway 73 to the Main (North) Gate, and via State Highway 73 directly connecting to the Doolittle Road and the East Gate.

1.2.9.2 Entry to the TOCDF is controlled through the Entry Control Facility (ECF) located at the southern end of the facility. Attachment 4 (Security) provides a detailed narrative describing the security measures that are in place at the TOCDF and how access is controlled. All personal vehicles are parked outside of the TOCDF and do not impact the traffic within the fence.

1.2.9.3 Generally, all traffic (including government vehicles, commercial carriers, and privately owned vehicles) follows the primary traffic route. Only security vehicles, conventional-munitions transportation vehicles, and maintenance vehicles travel off of the primary route.

1.2.9.4 As shown in Drawing TE-16-C-2, the TOCDF is immediately adjacent to and physically connected to Area 10, and therefore, the area becomes a contiguous restricted area. Consequently, there are no over-the-road transport or demilitarization items outside of this area.

1.2.10 **Local Well Information and Groundwater Conditions**

1.2.10.1 There are no injection or withdrawal wells located at the TOCDF. Figure 1-3 shows the approximate locations of six groundwater monitoring wells found near the TOCDF sewage lagoon.

1.2.10.2 Groundwater occurs in three distinct aquifers in Rush Valley. The most extensive aquifer is the basin-fill aquifer. The overlying, relatively impermeable, clay-sized lacustrine sediments confine this aquifer, and restrict hydraulic communication between it and the

[14] As shown in Figure 1-1, the Oquirrh Mountains lie to the east and the Onaqui and Stansbury Mountains to the west of the TOCDF.

playa surfaces. The sand and gravel of the alluvial fans along the flanks of the mountains compose the second alluvial-fan aquifer. The highest quality groundwater obtainable in Rush Valley is contained in this aquifer. The third is an unconfined, shallow-brine aquifer, which lies just below the valley surface. Groundwater quality in the Rush Valley ranges from fresh to briny.

1.2.10.3 Recharge to Rush Valley is almost entirely provided by rainfall and snow melt from the surrounding mountains. The basin-fill aquifer is recharged by subsurface inflow from adjacent alluvial fans and underlying Tertiary or Paleozoic rocks.

1.2.10.4 A southwest-to-northwest trending groundwater divide, which passes through the DCD, separates the flow of groundwater in Rush Valley into two distinct regions. Precipitation entering the ground water beneath the TOCDF can flow either toward South Mountain or the Thorpe Hills, depending upon which side of the divide they enter the aquifer.

1.2.11 Buildings/Structures

1.2.11.1 Drawing TE-16-C-2 shows all existing buildings, roads, railroads and fences in the vicinity of the TOCDF. Major buildings/structures located inside the TOCDF security fence include the following: Container Handling Building (CHB); Entry Control Facility (ECF); Monitor Support Building (MSB); Treaty Compliance Building (TCB); Pollution Abatement System (PAS); Personnel Maintenance Building (PMB); Process and Utility Building (PUB); Various craft shops and supply warehouses; Brine Reduction Area Pollution Abatement System (BRA PAS); Heating, Ventilation, Air Conditioning (HVAC) Filters; and Munitions Demilitarization Building (MDB).

1.2.11.2 Major components of the MDB include the following: Deactivation Furnace System (DFS); Metal Parts Furnace (MPF); Two Liquid Incinerators (LICs); Dunnage Incinerator (DUN) and associated PAS (not used); Control Room; and various disassembly and support areas essential for processing the full range of the DCD’s unitary stockpile of agents and munitions.

1.2.11.3 Major buildings/structures located outside the TOCDF security fence include the following: Chemical Assessment Laboratory (CAL); Communication Switch Building (CSB); Personnel Support Building (PSB); On-Site Inspection Agency (OSIA); and Warehouse Buildings S-7 and S-8.

1.2.12 Sewers (Storm, Sanitary, Process)

1.2.12.1 There are no sanitary or process sewage systems within the 1,000-foot radius of the TOCDF, other than the one constructed for the TOCDF. Location of the TOCDF Sewage Lagoon is shown on Drawing TE-22-C-10.

1.2.13 Loading/Unloading Areas

1.2.13.1 The chemical agents stored at the DCD Area 10 are stored in rockets, land mines, mortars, artillery projectiles and cartridges, bombs, spray tanks, and ton containers. The munitions or bulk containers are loaded into overpacks in Area 10, placed on specialized trucks, and taken to the CHB.[15] The overpacks are moved from the CHB by conveyor to the Unpack Area (UPA) of the MDB. At the UPA, the air inside the overpack is monitored for agent, which would indicate a leaking container.

1.2.13.2 A second unload area involves the transfer of fuel and bulk chemicals from trucks to the Bulk Chemical Storage (BCS) facilities and Liquefied Petroleum Gas (LPG) tank.[16] The BCS facilities house the concentrated chemical solutions from which the decontamination, caustic wash, and neutralization solutions are made. The bulk chemicals are sodium hydroxide (18% by weight) and sodium hypochlorite (12% or less by weight). LPG and each bulk chemical have its own storage tank or tanks, its own supply pumps, and its own distribution system. Tanker trucks supply the feedstock for the bulk chemicals or LPG. The trucks supply the TOCDF with bulk chemical stock solutions in the concentrations shown above.

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1.2.14 Fire Control Facilities

1.2.14.1 The MDB interior fire systems are designed to meet National Fire Protection Association (NFPA) standards. The fire water storage requirement is 330,000 gallons. Portable fire extinguishers, a sprinkler system, dry chemical systems, and a Halon system are all built into the facility to minimize the threat of fire.

1.2.14.2 Water for the TOCDF is pumped from two wells located north of Stark Road (approximately 2 $^1/_4$ miles northeast of the TOCDF).[17] Pumps are installed at the existing DCD withdrawal wells to produce the anticipated 616,000 gallons per day required at DCD. The DCD withdrawal wells are located east-northeast of the TOCDF and more than 5 miles distant. The well pumps supply water to the two existing reservoirs (with a combined capacity of 1 million gallons). These reservoirs supply the existing water distribution system at DCD. The water main is capable of supplying a 500,000-gallon Firewater Tank[18] that may be used to augment the water supply from the two DCD reservoirs. This tank has been sized to provide for 12 hours of operation at the TOCDF and the fire water requirement of 330,000 gallons in lieu of the DCD water supply. The pump is provided at the Firewater Tank to meet fire flow demands. All Firewater Tank system components are designed to meet NFPA standards.

1.2.14.3 The water is chlorinated at the wellhead and then moves to the 500,000 gallon Firewater Tank if the tank is in use. The tank is located approximately 4,000 feet northeast of the TOCDF site. The water flows directly to the TOCDF past the Firewater Tank during periods of high demand and refills the tank during periods of low demand. When the water demand for the site exceeds the flow capacity of the wells, water flows out of the Firewater Tank, and a Firewater Pump just downstream of the tank increases the flow and pressure as needed. A pipe carries water from the Firewater Tank to the TOCDF. A pipe loop around the TOCDF supplies fire-fighting water to the site and to the fire-fighting

[15] See Drawing TE-16-C-5.

[16] See Drawing TE-16-C-4.

[17] See Drawing TE-16-C-2.

[18] See Drawing TE-22-C-13.

systems in the CHB, PMB, and MDB. A pipe from this loop supplies water for the Water Treatment System (WTS, located in the PMB). Softened water from the WTS feeds the Potable Water System (POT) and Process Water Systems (PRW).

1.2.15 **Flood Control and Drainage Barriers**

1.2.15.1 Drawings TE-16-C-2 and TE-16-C-3 are topographic maps of the TOCDF and the local surrounding area. (**Note:** TE-16-C-3 is considered “restricted access – protected record.”) Drainage from the facility is westerly. The overall drainage gradient for the TOCDF is 1% or greater. The topography is generally smooth and uniform, allowing no chance for ponding or pooling of runoff waters. Natural drainage channels exist and do not direct water onto the facility.

1.2.15.2 The TOCDF covers approximately 40 acres and is largely covered by dirt, gravel, and impermeable surfaces (for example, buildings, asphalt, and concrete paving). Runoff from the TOCDF is controlled by the slope of the asphalt and concrete pavement and is directed towards storm drains, ditches, and culverts within the TOCDF. All on-site surface runoff is collected in an underground drainage system and routed to the storm drain detention pond.[19] The pond is sized for the 100-year storm. Temperatures as well as types and amounts of precipitation are discussed in paragraph 1.2.15.3 below. No surface waters are used as public water supplies in the immediate vicinity of TOCDF. Surface water is used primarily for agricultural purposes in Rush Valley.

1.2.15.3 The climate of the TOCDF is characterized as dry continental and is heavily influenced by the mountains surrounding the facility. Temperatures are frequently above 32°C (90°F). High temperatures of 37°C (100°F) and low temperatures of -17°C (0°F) occur. The area is noted for plentiful sunshine, low relative humidity, and light precipitation. Annual rainfall varies between 25-30 centimeters (10-12 inches), distributed primarily from mid-fall through late spring. April is the wettest month, with an average of 2.00 inches of rain. July is the driest month, with an average of 0.64 inches. Snow averages 40 inches per year, with the maximum (13.2 inches average) in January, and snowfall greater than 1 inch during each month from October through April.

1.2.15.4 There is minimal tornado exposure (no known touchdowns in the valley since 1984) and minimal earthquake exposure.

1.2.16 **Run-off Control Systems**

1.2.16.1 The location of the TOCDF is such that it is virtually devoid of surface water features or intermittent streams.[20] The access road to the North and East acts as a barrier to divert runoff from higher elevations. Drawings TE-16-C-32, -33, -34 and EG-16-C-7402 detail the storm drainage features of the TOCDF.

1.2.17 **Proposed New and Existing Hazardous Waste Management Units**

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[19] The storm water detention pond lies approximately 200 feet due west of the TOCDF as indicated on Drawing TE-16-C-3.

[20] See paragraphs 1.2.4 through 1.2.4.2 for a discussion of surface water features in Rush Valley.

1.2.17.1 The only waste management units in the immediate vicinity of the TOCDF plant are those units located at the facility itself.[21]

1.2.18 **Spill Sites**

1.2.18.1 Module VII provides information regarding spill sites.

1.3 LOCATION INFORMATION

1.3.1 Seismic Standard [R315-3-2.5(b)(11), R315-8-2.9(a)]

1.3.1.1 The DCD is located in Tooele County, which is one of the counties listed in 40 CFR 264 Appendix VI. Since the installation is located in a political jurisdiction listed in Appendix VI, a geologic evaluation of the area has been performed in accordance with R315-3-2.5(b)(11).

1.3.1.2 Findings were presented in a report to the U.S. Army Engineering Division, Huntsville, Alabama, and the Office of the Program Manager for Chemical Demilitarization (PMCD), (which were the designated agencies in 1986). The findings of the report[22] are as follows:

1.3.1.2.1 One inferred fault occurs within a 3,000-foot radius of the site. The fault is inferred, presumably because geologic field evidence for the fault is unclear.

1.3.1.2.2 No direct geologic information is provided in geologic literature on the absolute age of the most recent fault displacement for the inferred fault.

1.3.1.2.3 Interpretation and evaluation of the available geologic literature indicate that the inferred fault could have had displacement sometime during the past 15,000 years. The Holocene epoch began 10,000 years ago.

1.3.1.3 On the basis of these findings, a geologic study was performed to:

1.3.1.3.1 evaluate geologic evidence for the inferred fault,

1.3.1.3.2 explore for other faults associated with the inferred fault in the area of the site, and,

1.3.1.3.3 obtain field data that may refine current estimates as to the age of the most recent displacement.[23]

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[21] See Drawing TE-16-C-3.

[22] "Geologic Evaluation for Compliance with Seismic Location Standard 40 CFR 270.14(b)(11) for Siting a Chemical Agent Disposal System (CADS) at the Tooele Army Depot, South Area, Tooele County, Utah." The report is dated June 5, 1986.

[23] See, "Geologic Field Analysis for Siting a Chemical Agent Stockpile Disposal System at the Tooele Army Depot, South Area, Tooele County." The report is dated December 15, 1986.

1.3.1.4 The field study resulted in the identification of faults at three locations along a 2,250-foot-long trench. Geologic mapping of the deposits offset by the faults and development of age criteria for the deposits indicate that none of the identified faults is younger than 14,500 years. This determination is supported, in general, by the absence in the project area of land forms that are characteristic of youthful faulting. It is concluded that fault displacement has not occurred at the project site during the Holocene Epoch (i.e., the past 10,000 years), and that the site is acceptable according to 40 CFR 264 and 270 and UAC R315.

1.3.2 Floodplain Standards [R315-3-2.5(b)(11)(iii), R315-8-2.9(b)]

1.3.2.1 The DCD has not been mapped for the National Flood Insurance Program and thus there are no 100-year floodplain maps for the installation. However, it has been determined that the site is outside of the 100-year floodplain and is not subject to flooding, based on the following:

1.3.2.2 There is no history of flooding in the area. No floods have occurred at DCD since the depot came into existence in 1942.

1.3.2.3 The overall drainage gradient for the entire TOCDF area is 1% or greater. The topography is generally smooth and uniform, allowing no chance for ponding or pooling of runoff waters. The lack of intermittent streams or defined flow paths in Rush Valley confirm the lack of flooding potential. The location of the TOCDF is such that it is virtually devoid of surface water features or intermittent streams. The closest body of surface water (i.e., 3-4 foot wide Ophir Creek) is located more than 1000 feet north of the TOCDF fence and does not appear on the topographic maps.

1.3.2.4 Drainage for the entire DCD is westerly, and the low area is more than 170 feet lower in elevation, and approximately 11 miles distant (i.e., Rush Lake) from the TOCDF.

1.3.2.5 Few well-defined natural drainage channels exist in the vicinity; there are none that would carry or direct water to or through the site.

1.3.2.6 All on-site surface runoff is collected in an underground drainage system and routed to the storm drain detention pond sized for the 100-year storm.

1.3.2.7 No significant vegetation exists to retain runoff waters.

1.3.2.8 The area is arid to semi-arid and receives little precipitation. The 100-year 24-hour precipitation event is less than 3.3 inches.

1.3.2.9 Due to local drainage at the site, the Rational Method was used to establish the 100-year frequency peak flow. The Rational Method is a simple, but accurate, hydrologic estimating technique generally used in small drainage area such as the local flow area at the TOCDF. There was no hydrologic study performed for the Rush Valley floor, given the site's history of no flooding and the relative height of the TOCDF above the valley floor. No computer modeling was performed for hydraulic analysis.

1.3.2.10 Because of the unique characteristics of each watershed in arid regions such as Utah, it would not be appropriate to predict floods from the 460-square mile Rush Valley drainage area by the Rational Method or any method other than historic records at the site. Since there is no history of flooding in Rush Valley, it is expected that the "100-year flood" would be practically insignificant. The TOCDF elevation of 100 to 200 feet above the valley floor puts it well beyond any expected flood level.

1.3.2.11 For local flooding, conservative "n" values or 0.035 were used to compute flood depths in channels. For bare earth channels, roughness would be lower, producing lower flood depths. In Rush Valley, roughness coefficient estimates were not needed because of the lack of flood potential. There are no bridges or stream channels in the vicinity of the TOCDF for analysis.

1.3.3 On-site Drainage

1.3.3.1 The TOCDF occupies approximately 40 acres and is largely covered by a variety of surfaces (i.e., buildings, asphalt, gravel, and concrete paving) such that runoff drains overland to the west. Runoff from the TOCDF is controlled by the slope of the asphalt and concrete pavement towards storm drains, ditches, and culverts within the TOCDF. All on-site surface runoff is collected in an underground drainage system, which drains to the storm drain detention pond. The site has been carefully graded so that water does not run towards any building and has a generally constant gradient of greater than 1%. The 100-year, 24-hour precipitation is less than 3.3 inches and poses no flood threat to the TOCDF from local ponding.

1.3.3.2 The site access road also acts as a barrier to runoff from the north and east of the site. There is no site run off expected from any other direction. A culvert allows some drainage to flow toward the TOCDF plant site. Approximately 36 cubic feet/second of runoff will flow across the northern end of the TOCDF parallel to the existing exclusion fence. This drainage flows in a culvert where it passes under the security fence, and in an open ditch within the site. All other off-site drainage is diverted around the southern end of the site. The direction of surface water runoff flow is shown by bold arrows on the Topographic Map, TE-16-C-3 (restricted access - protected record).

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1.4 TRAFFIC PATTERNS [R315-3-2.5(b)(10)]

1.4.1 General Depot Traffic

1.4.1.1 Access to the DCD is via County Road 198, connecting State Highway 73 to the Main (North) Gate, and via State Highway 73 directly connecting to the Doolittle Road and the East Gate.[24] Both State Highway 73 and County Road 198 are two-lanes, undivided, asphaltic concrete roads zoned from 55 to 65 mph. Neither highway is heavily traveled. The intersections of State Highway 73 and County Road 198 as well as the Doolittle Road with State Highway 73 are simple interchanges. Traffic control at the Highway/Doolittle interchange is via a stop sign on County Road 198. Traffic control at the Doolittle Road/Highway 73 interchange is by a stop sign on Doolittle Road.

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[24] See Drawing TE-16-C-2.

1.4.1.2 The DCD West Gate is used at the discretion of DCD and the gate is kept locked. Access to the West Gate is via State Highway 36 onto Harrison Road. State Highway 36 is a two-lane, undivided, asphaltic concrete road. The Highway 36/Harrison Road intersection is a simple interchange with traffic control by a stop sign on Harrison Road.

1.4.1.3 The TOCDF road system consists of undivided, asphaltic concrete roads. There are no one-way streets, traffic control devices, or signs within the TOCDF. Entry to the TOCDF is controlled through the ECF. All personal vehicles are parked outside of the TOCDF and do not impact the traffic within the facility.

1.4.1.4 Generally, all traffic, including government vehicles, commercial carriers, and privately owned vehicles, follow the primary traffic route. Only security vehicles and maintenance vehicles travel off of the primary route.

1.4.1.5 As shown in Drawing TE-16-C-2, the TOCDF is immediately adjacent to and physically connected to Area 10, and therefore, the area becomes a contiguous restricted area. Consequently, there is no over-the-road transport of demilitarization items outside of this area. Internal traffic movement between the storage and the demilitarization operating area is discussed in paragraph 1.4.2.

1.4.1.6 Incinerator residues are disposed of off site at an approved hazardous waste management facility. These materials are properly manifested and handled from the site to the off-site facility by a licensed transporter of such materials. Traffic patterns on site for these materials follow the primary traffic route discussed in paragraph 1.4.1.3 from the facility plants to the depot boundary. Volumes and frequency of shipments are discussed in paragraph 1.4.3.

1.4.2 Traffic Control

1.4.2.1 Because of the low volume of traffic at DCD, traffic control measures are simple. Speed is restricted to 30 mph unless otherwise posted (e.g., office areas and parking lots), and 45 mph is posted for most of the primary traffic route. All blind or hazardous turns are marked and posted at reduced speeds. Yield signs and stop signs control traffic at all major intersections. All railroad grade crossings are marked with signs. Traffic control enforcement is by security personnel.

Deleted: 20 mph is posted in building and office areas,

Deleted: ; the sole stop sign at DCD is the security gate on Montgomery Road.

1.4.3 Estimated Volume and Frequency of Shipments

1.4.3.1 It is estimated that 500 vehicles will pass the security gate daily. Of the estimated 500 vehicles, 10 to 15 are commercial carriers (semis or truck-trailers) traveling almost exclusively to the TOCDF area. An additional 35 to 40 vehicles (including security and maintenance) travel to other destinations throughout the DCD.

1.4.4 Road Surfacing and Load Bearing Capacity

1.4.4.1 Roads, parking areas, and driveways are paved. In general, all main access routes serving the TOCDF area are of asphalt. The roads have 12-foot-wide lanes with a minimum cross slope of 2 percent and 3-foot-wide dirt/gravel shoulders.

1.4.4.2 The maximum load assumed for design is the American Association of State Highway and Transportation Official's H20 loading:

1.4.4.2.1 18,000 pound axle load,

1.4.4.2.2 32,000 pound maximum axle group,

1.4.4.2.3 80,000 pound maximum vehicle weight.

1.4.5 **Restricted Area Traffic**

1.4.5.1 Total associated two-way traffic on the roads used for the transport of the PAS Brines, DFS and MPF ash, and metal residue from the facility plants to the storage area ranges between 10 to 28 vehicles per day, depending on the type of munition being processed. The truck traffic moving munitions between Area 10 and the CHB varies daily depending on the munition being processed. This estimate does not include traffic associated with Area 10 maintenance, operations, and security, which is estimated at an additional 10 vehicles per day.

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ATTACHMENT 2

WASTE ANALYSIS PLAN

Supporting Documentation is located in Attachment 3.

TABLE OF CONTENTS

TOCDF WASTE ANALYSIS PLAN

LIST OF ACRONYMS	
Acronym	**Definition**
ACS	Agent Collection System
AQS	Agent Quantification System
BRA	Brine Reduction Area
Btu	British Thermal Unit
CAL	Chemical Assessment Laboratory
CAMDS	Chemical Agent Munitions Disposal System
CTC	Cutaway Ton Container
DFS	Deactivation Furnace System
DCD	Deseret Chemical Depot
DSHW	Division of Solid and Hazardous Waste
ECR	Explosive Containment Room
EPA	Environmental Protection Agency
GB	Sarin, Isopropyl methylphosphonofluoridate
GC/MS	Gas Chromatography/mass spectrometry
H/HD/HT	Sulfur Mustard[1]/Distilled Sulfur Mustard/Distilled Mustard with 40% Bis[2-(2-chloroethylvthio)-ethyl] ether
HDC	Heated Discharge Conveyor
HEPA	High Efficiency Particulate Air
HRA	Hazard Risk Assessment
LIC	Liquid Incinerator
MDB	Munition Demilitarization Building
mg/m^3	Milligrams per cubic meter
MPF	Metal Parts Furnace
MSB	Monitor Support Building
ONC	On-site Container
PAS	Pollution Abatement System
PCB	Polychlorinated Biphenyl Compounds
ppb	Parts per billion
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RHA	Residual Handling Area
SDS	Spent Decontamination System
Subtitle C TSDF	Hazardous Waste Treatment, Storage and Disposal Facility
TC	Toxicity Characteristic or Ton Container
TCLP	Toxic Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TMA	Toxic Maintenance Area
TOCDF	Tooele Chemical Agent Disposal Facility
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage and Disposal Facility
TSS	Total Suspended Solids
UPA	Unpack Area
UPMC, UMC	Upper Munitions Corridor
VOC	Volatile Organic Concentration (BB/CC)
VX	O-ethyl-S-[2-diisopropylamino)ethyl] methyl phosphonothiolate
WCL	Waste Control Limit
WIC	Waste Incineration Container
Note: 1 Sulfur Mustard = Bis(2-Chloroethyl) Sulfide or 2,2'-Dichlorodiethyl Sulfide	

Deleted: CCL
Deleted: Chemical Control Limit for Mustard
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Deleted: VXH
Deleted: VX Hydrolysate

2.1. **INTRODUCTION**

2.1.1. Generators of hazardous waste are required to obtain detailed chemical analyses of wastes they intend to treat, store, or dispose of in order to ensure proper hazardous waste management practices.

2.1.2. This Waste Analysis Plan describes:

2.1.2.1. The physical and chemical analyses the Permittee shall perform before hazardous wastes are stored, treated, or transported off site for further treatment and ultimate disposal,

2.1.2.2. The methods and frequency to be used to collect and analyze samples,

2.1.2.3. The procedures that will be used to ensure the validity of the analytical results, and

2.1.2.4. The basis for generator knowledge.

2.1.2.5. Tables 2-0 and 2-1 presents a summary of this entire waste analysis plan. For each waste stream specified, these tables present the selected analytical parameters and corresponding analytical methods, sampling frequencies, and sampling methods. In addition the tables include either a reference to the unit that will treat each waste stream (for waste to be treated on site) or a reference to the process generating each waste stream (for wastes to be treated and disposed of off site).

2.2. **PARAMETERS AND RATIONALE 40 CFR 264.13(b)(1) [R315-8-2.4]**

2.2.1. **Analyses for Wastes Requiring On-Site Treatment**

2.2.1.1. Waste streams included in this section are treated on site in one or more of the four incinerators, or the Brine Reduction Area. Analytical parameters were selected for each waste stream based on previous analytical results obtained for similar waste streams, the homogeneity of the waste and the ability to obtain a representative sample, and/or government manufacturing specifications (in regards to munition energetic components).

2.2.1.2. The Permittee shall determine the hazardous constituents in the waste streams to be treated on site. The Permittee shall also determine the underlying hazardous constituents as applicable in 40 CFR 268.9. For wastes to be treated on site, which are not included in Table 2-0, the Executive Secretary shall be notified of the most appropriate management practices including treatment methods and appropriate waste analyses. This notification shall be in writing and occur within seven days from the time when the Permittee determines a waste has been generated that is not included in Table 2-0. The Executive Secretary will determine if the chosen treatment is acceptable.

2.2.1.3. Chemical Agents GB, VX, Mustard (HD/H/HT)

2.2.1.3.1. Previous analyses of chemical agents have identified agent breakdown products and organic stabilizers (referred to collectively as agent organic content), and metal constituents. Data compiled from these previous analyses have been used to establish expected ranges for agent organic content (see Table 2-A-2) and metal constituents.

2.2.1.3.2. The Permittee shall analyze the chemical agent prior to each agent campaign from bulk containers. Agent samples shall be collected from a representative number of bulk containers agreed upon with the DSHW. The containers shall be sampled and analyzed following an approved sampling and analysis plan.

2.2.1.3.3. At the beginning of each munition or bulk container campaign, agent samples shall be collected using a sampling scheme that is approved by the Executive Secretary. The samples shall be analyzed as specified in Table 2-0.

2.2.1.3.4. Metals included in the HRA list are Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, and Zinc.

2.2.1.3.5. The metals analysis associated with the agent waste profile will be accomplished using the methods described in Tables 2-0 and 2-3. The metal analytes quantified will be the HRA metals listed in Paragraph 2.2.1.3.4.

2.2.1.3.6. Baseline Mustard Ton Containers

2.2.1.3.6.1 Prior to TOCDF receipt of Mustard ton containers, each TC shall have been sampled and analyzed at DCD Area 10 in accordance with the Area 10 Sampling Program approved by the Executive Secretary.

2.2.1.3.6.2 During the LIC ATB shakedown for baseline Mustard ton containers, each week one sample shall be collected from the ACS tank and analyzed for HRA metals, agent organics content and density, provided the ton container's liquid contents have been previously sampled and analyzed at Area 10 for HRA metals and shown to contain less than one part per million of mercury (< 1 ppm).

2.2.1.3.6.3 During LIC post-ATB and long-term incineration processing of Mustard baseline ton containers, he DCD Area 10 liquid Mustard sample analyses results will be used by TOCDF for characterization for the liquid Mustard in the baseline ton containers.

2.2.1.3.6.4 During the MPF ATB shakedown for baseline Mustard ton containers, sludge/solid samples will be collected in accordance with the MPF Mustard Trial Burn Plan.

2.2.1.3.7. The metals analysis associated with the agent samples collected in compliance with Paragraph 2.2.1.3.6. may be performed using either the site specific or the SW-846 methods described in Tables 2-0 and 2-3. Analytes quantified by the SW-846 methods shall be those HRA metals listed in paragraph 2.2.1.3.4.

2.2.1.3.8. Reserved.

2.2.1.3.9. Based on the results of the agent sampling and analytical, agent feed rates to the incinerators shall be adjusted, as necessary, to ensure continued compliance with the metal feed rate limits.

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Deleted: each full tank of agent collected in the ACS Tanks, meaning that each agent collection tank will be filled to permitted capacity, one sample shall be collected and analyzed for HRA metals. Every fifth full tank of agent shall be analyzed for agent organic content and density.

Deleted: . Sampling the ACS tank contents will be discontinued after the LIC ATB.

2.2.1.3.10 For each agent organic analysis and metals analysis, a summary of the results shall be submitted to the Executive Secretary monthly.

2.2.1.3.11 Appendix A of this waste analysis plan contains the following information regarding the chemical agents to be incinerated at the TOCDF:

2.2.1.3.11.1 Table 2-A-1: Physical Properties of Chemical Agent (as a pure substance)

2.2.1.3.11.2 Table 2-A-2: Chemical Agent Composition

2.2.1.4. Spent Decontamination Solutions

2.2.1.4.1. Spent decontamination solutions treated on site shall be treated in the primary or secondary chambers of the LICs.

2.2.1.4.2. Spent decontamination solution collected in SDS-TANK-101, SDS-TANK-102, or SDS-TANK-103 shall be sampled and analyzed. Spent decontamination solutions shall be analyzed for chemical agent concentration, corrosivity (pH), specific gravity, HRA metals, TC volatile organics, explosives, and screened for organics.

2.2.1.4.2.1. The parameters of agent concentration, pH, specific gravity, and the organic screen shall be determined for each tank of spent decontamination solution processed. The results shall be available prior to incineration.

2.2.1.4.2.2. Confirmatory analyses for HRA metals, TC volatile organics and explosives in spent decontamination solutions shall be performed quarterly.

2.2.1.4.2.3. The sampling and analyses of spent decontamination solutions for the purpose of demonstrating compliance with Subpart CC regulations shall be performed as described in Section 2.10 of this attachment.

2.2.1.4.3. If results of the organic screen show that the spent decontamination solution contains organics in excess of five percent, the tank of spent decontamination solution shall be analyzed per Table 2-0. The Executive Secretary shall be notified prior to treatment of the solution.

2.2.1.4.4. If chemical agent is detected above the Waste Control Limit (WCL) (i.e., 20 parts per billion (ppb) for GB, 20 ppb for VX, and 200 ppb for Mustard), additional decontamination solution shall be added to the tank, the contents of the tank shall be recirculated (i.e., mixed), and another sample shall be analyzed for agent. This procedure shall be repeated until the chemical agent concentration is below the limits specified above.

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2.2.1.5. Agent Collection System (ACS) & Agent Quantification System (AQS), Spent Decontamination System (SDS) Maintenance Residues

2.2.1.5.1 The chemical agent contaminated debris and sludges generated from the maintenance of the ACS, AQS, and SDS equipment located in the Munitions Demilitarization Building (MDB), but outside the Explosive Containment Rooms (ECRs), can be incinerated in the Metal Parts Furnace (MPF).

2.2.1.5.1.1. ACS tank bottoms shall be characterized prior to treatment in the MPF. Samples shall be analyzed for HRA metals.

2.2.1.5.2. Collected ACS/AQS maintenance residues shall be weighed and characterized prior to incineration to ensure feed rates established for the MPF are not exceeded. The Operating Record shall include a detailed description of the residues fed to the MPF.

2.2.1.5.3. ACS/AQS/SDS maintenance residues shall be properly managed prior to treatment in the MPF.

2.2.1.5.4 ACS, AQS and SDS sludge shall be categorized as Agent Contaminated Sludge and managed as specified in paragraph 2.2.1.18.

2.2.1.6. Secondary Waste Noncombustible Bulk Solid Waste Category

2.2.1.6.1. Noncombustible Bulk Solid Secondary Waste is composed of inert material that does not combust when placed into the incinerator. Examples of this waste are discarded components of MDB process equipment, and carbon filter trays (from which all carbon has been removed).

2.2.1.6.2. The physical state of these wastes (i.e., debris) prevents the collection of a representative sample. All wastes included in this category are described by the Utah Hazardous Waste code P999. Other waste codes may apply based on generator knowledge.

2.2.1.6.3. Wastes included in this category shall be placed onto MPF burn trays or thermally treated ton containers that have been cut in half (cutaway ton containers or CTC) or Waste Incineration Containers (WICs). All wastes shall be weighed and characterized prior to being treated in the MPF to ensure compliance with this Permit. The Operating Record shall include a detailed description of the residues fed to the MPF in each burn tray, WIC or CTC.

2.2.1.6.4. Noncombustible Bulk Solid Wastes shall be properly managed prior to treatment in the MPF.

2.2.1.6.5. Management of Noncombustible Bulk Solid Waste shall be in accordance with paragraph 2.2.1.17.6 prior to treatment in the MPF.

2.2.1.7. Drained Bulk Containers & Projectiles with Agent Residue

2.2.1.7.1. Drained bulk containers and projectiles with chemical agent residue (heel) shall be treated in the MPF. Previous analytical results show some of the chemical agent to contain concentrations of metals. In addition, the paints used on the containers and projectiles have metal-containing pigments.

2.2.1.7.2. The chemical agents and item surface coatings (i.e., paint) are both organic matrices containing metal constituents. Metal constituents contained in organic matrices are referred to as non-embedded metals. Non-embedded metals may potentially volatilize during incineration.

2.2.1.7.3. Appendix B contains the following tables regarding the metals associated with each type of chemical agent munition and bulk container to be treated at the TOCDF:

2.2.1.7.3.1 Table 2-B-1: Metals in Munitions (presents by munition or bulk container, the total metal loading for non-embedded metals whose emission rates are regulated by this Permit)

2.2.1.7.3.2 Table 2-B-2: Metals in Munitions (presents, by munition or bulk container, the total metal loading for non-embedded metals whose emission rates are considered in the TOCDF HRA)

2.2.1.7.4. Data included in these tables can be used to determine the quantity (and associated feed rate) of non-embedded metals fed to the incinerator.

2.2.1.7.5. ICC VX Test Cylinders are characterized as "bulk containers" for the purposes of this Waste Analysis Plan. However, the VX Test Cylinders are not required to be drained prior to incineration in the MPF.

2.2.1.8. <u>Energetic Munition Components</u>

2.2.1.8.1. Energetic munition components shall be incinerated in the DFS.

2.2.1.8.2. The Permittee may use generator knowledge to determine the type and amount of explosive and propellant being fed to the DFS.

2.2.1.8.3. Appendix C contains the following tables pertaining to explosive/propellant and agent fill weights and compositions:

2.2.1.8.3.1. Table 2-C-1: Energetic/Agent Nominal Weight for Chemical Agent Munitions and Bulk Containers

2.2.1.8.3.2. Table 2-C-2: Composition of Reactive Material in Munitions

2.2.1.8.4. Explosive and propellant formulations are organic matrices containing metal constituents. The metals contained in these formulations will potentially volatilize during incineration (i.e., the metals are non-embedded).

2.2.1.8.5. The quantity of each metal identified in Table 2-C-2 has been incorporated into Tables 2-B-1 and 2-B-2 found in Appendix B which present the total non-embedded metals for each munition and bulk container type to be treated at the TOCDF.

2.2.1.9. <u>ECR Maintenance Residues</u>

2.2.1.9.1. Maintenance performed on the demilitarization machines, Agent Quantification System (AQS) components, and Agent Collection System (ACS) components that are located in the Explosive Containment Rooms (ECR) will generate waste residues. Dry residues and sludge shall be placed into paper buckets prior to being fed to the DFS. A list of the ECR Maintenance Residues is provided in Table 2-2a.

TABLE 2-2a: Contaminated Waste	
ECR Maintenance Residues Waste Stream	Allowable Waste Codes(s)
• Filter elements and bags • Munition fragments (fiberglass, metal and explosives) • Dust, dirt, debris, ECR sump sludge • Munition components/fragments (i.e., burster fragments, supplementary charges, spacers, support cups, lifting lugs, and fuze adaptors that fall onto the turntable or floor) • Clean-up material (e.g., rags, absorbent pads) • Cotton goods (e.g., coveralls, mop heads) • ECR Sump strainers • Unserviceable hand tools and metal hardware (e.g., nuts, bolts, washers) • Burlap bags •	P999, F999, D002, D003, D004, D005, D006, D007, D008, D009, D010

Deleted: <#>Chemical agent liquids, sludges and solids from AQS/ACS filters¶

Deleted: Mine components that fall onto the Mine Machine or floor

2.2.1.9.2. The Permittee shall decontaminate the unserviceable hand tools and metal hardware identified in Table 2-2a and process them in the MPF. If the explosive residue remains on the tools after decontamination, the metal tools and hardware shall be processed in the DFS. The maintenance residues in Table 2-2a may be contaminated with small amounts of spent decontamination solution, agent, hydraulic fluid, or lubricating fluid. Explosives-contaminated rags generated by personnel wiping explosive residues from reject munitions in the UPMC or ECV shall be fed to the DFS.

2.2.1.9.3. ECR maintenance residues shall be weighed and properly identified as to the origin and physical characteristics prior to incineration to ensure the DFS feed rate limits are not exceeded.

2.2.1.9.4. ECR maintenance residues are typically discarded items having agent surface contamination, explosive surface contamination, or both. Operation of equipment in the ECRs can generate explosive powders. ECR maintenance residues composed of powdered explosive and munitions components shall be managed separately from other ECR maintenance residues. The feed rate of ECR maintenance residues composed of explosive powders and munition components shall be limited to 3.6 pounds per drop with an internal kiln spacing of one flight between successive drops. The hourly feed rate is specified in Modules V (Long-Term Incineration) and VI (Short-Term Incineration).

2.2.1.9.5. ECR maintenance wastes charged to the DFS that do not contain explosive components or containers of explosive powder are assumed to consist entirely of agent.

2.2.1.10. Spent Activated Carbon

2.2.1.10.1. Prior to completion of closure of the TOCDF, the Permittee shall treat all site-generated carbon in the Carbon Micronization System (CMS). Prior to treatment in the CMS, a successful performance test shall be conducted based on an approved test plan.

2.2.1.10.2. The spent carbon shall be placed into permitted storage areas designated to store waste contaminated with the same type of chemical agent until the results of a performance test are approved by the Executive Secretary.

2.2.1.10.3. PPE respirator carbon canisters and ACAMS filter canisters may be processed in the MPF per the specified feed rates in Table V.C.1.

2.2.1.11. Agent Contaminated Dunnage

2.2.1.11.1. Dunnage meeting the following definition shall be characterized as P999 hazardous waste. Agent contaminated dunnage is defined as:

2.2.1.11.1.1. All dunnage held within an ONC or munitions overpack that is found to contain leaking munition(s) as evident by agent monitoring results of the air within the sealed ONC or overpack having a concentration of 0.5VSL or above, or

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2.2.1.11.1.2. Dunnage that contacted leaking munitions or is contaminated with liquid agent, or

2.2.1.11.1.3. Dunnage that has been sampled and the analytical results of an extract prepared from a representative sample have been found to contain agent at concentrations equal to or greater than 20 ppb for GB and VX, and 200 ppb of Mustard (H/HD/HT.)

2.2.1.11.2. Dunnage characterized as P999 hazardous waste shall be treated in the MPF based on completion of a successful performance test in accordance with an approved test plan.

2.2.1.11.3. Reserved.

2.2.1.11.4. Within 180 days of the effective date of this Permit, the Permittee shall submit a performance test plan for dunnage management, which is sufficient to support completion of the treatment and disposal of dunnage waste streams.

2.2.1.11.5. Dunnage associated with M55 rockets will additionally be analyzed for PCBs to demonstrate that contact with PCB-regulated items (i.e., the M55 rocket shipping/firing tubes) did not cause cross-contamination of the dunnage.

2.2.1.11.6. The dunnage shall be placed into permitted storage areas designated to store waste contaminated with the same type of chemical agent until a dunnage management plan is approved by the Executive Secretary.

2.2.1.12. Combustible Bulk Solid Secondary Waste Category

2.2.1.12.1. Upon successful completion of the Secondary Waste Demonstration Test, wastes included in this category may be processed in the MPF. Wastes included in this category evolve combustion gases, and generate ash residues when incinerated. Examples of these wastes are Demilitarization Protective Ensemble (DPE) suits, and butyl rubber components.

2.2.1.12.2. TOCDF will either analyze a representative sample of these wastes or use generator knowledge to determine proper feed rates. If generator knowledge is used, it will be documented in the operating record.

2.2.1.12.3. Each waste feed charge shall be weighed prior to incineration to ensure TOCDF Permit conditions are not exceeded. The TOCDF operating record shall include an entry for each WIC of waste fed to the MPF. Each of these entries will include a description of the waste, the weight of the waste, metals content (the concentration if applicable), and the basis for categorizing the waste as a Combustible Bulk Solid.

2.2.1.12.4 Combustible Bulk Solid Wastes may be fed in the same WIC as other secondary waste categories provided all conditions of this attachment and Modules V and VI are met.

2.2.1.13. Personal Protective Equipment (PPE) Respirator and ACAMS Carbon Filter Canisters

2.2.1.13.1. Three types of PPE respirator canisters are used at the TOCDF to prevent the inhalation of chemical agent (pre-1993 M-40, post-1993 M-40 and DPE backpack). Two types of ACAMS activated-carbon filter canisters are used to control agent emissions from ACAMS sample line exhaust (aluminum housing and plastic housing). The respirator canisters are filled with approximately five ounces of carbon that is impregnated with copper, zinc, silver, and molybdenum, the approximate weight percent of each being: six, six, one one-hundredth, and three respectively.

2.2.1.13.2. PPE respirator carbon filter canisters generated in areas where the user is exposed to chemical agent vapors at concentrations at or above the STEL are considered contaminated with chemical agent.

2.2.1.13.3 The number of PPE or ACAMS carbon canisters added to each WIC and the material used to fabricate the outer shell of the canisters (PVC or aluminum) shall be noted in the operating record. The weights of carbon canisters shall be subtracted from the allowable weight of the secondary waste categories it is associated with e.g., PVC (combustible), aluminum (non-combustible),and carbon (metals/ash etc.)

2.2.1.14. Spent Scrubber Brines

2.2.1.14.1. Pollution Abatement System (PAS) scrubber brines are collected in one of four Brine Reduction Area (BRA) surge tanks. Scrubber brines collected in the BRA tanks shall be treated on site in the BRA evaporators and drum dryers or transferred to tankers and shipped off site to a Subtitle C Treatment, Storage and Disposal Facility (TSDF).

2.2.1.14.2. Each BRA tank of scrubber brines shall be analyzed for chemical agent concentration, corrosivity (pH), and specific gravity. On a monthly basis or each munitions campaign change, whichever is sooner, the Permittee shall sample and analyze a sample of scrubber brines taken from each BRA tank for HRA metals and total organics.

2.2.1.14.3. Scrubber brines generated from the treatment of M55 rockets shall additionally be analyzed for PCBs. Brines having more than three parts per billion (ppb) PCB are a TSCA regulated waste and will be managed at an approved TSCA TSDF.

2.2.1.14.4 The brine analysis shall be reported to the Executive Secretary if the result of the corrosivity analysis conducted on each batch of brines is found to be below a pH of 7.0. An oral notification shall occur within one day of the validation of the analysis. This notification will be followed up in writing within fifteen days from the date of validation.

2.2.1.14.5 Spent scrubber brines shall only be treated in the BRA if the agent concentration in the brines is found to be below 20 ppb for GB and VX, and 200 ppb for Mustard. If the agent concentration is greater than these values, the Permittee shall notify the Executive Secretary and concurrence shall be received before further treatment.

2.2.1.15. Miscellaneous Agent-Contaminated and Non-Agent-Contaminated Liquid Wastes

2.2.1.15.1. Agent-contaminated hydraulic fluid and lubricating oil generated in the MDB shall be either containerized and placed into permitted storage or containerized and transferred to the ACS tanks (e.g., via BDS) and subsequently treated in the LIC primary chambers. Before transfer to the ACS tanks, the container(s) shall be weighed (e.g., via BDS load cells or a calibrated scale in the TMA) and the contents shall be sampled and analyzed (ref: Table 2-0). The corresponding results shall be documented in the Operating Record. (Agent-contaminated shall be defined as being at or above 20 ppb for GB and VX, and 200 ppb for Mustard.

2.2.1.15.2. Agent-contaminated hydraulic fluid and lubricating oil may also be pumped to the ACS tanks, via the SDS collection system, and processed in the LIC primary chambers. A sample shall be collected from the spent decontamination tank before it is transferred to the ACS tank (ref: Table 2-0) for analysis.

2.2.1.15.3. Before treatment in the LICs, the samples described above shall be analyzed for HRA metals. The analytical results shall be used to ensure that LIC metal feed rate limitations are not exceeded. Additionally, the associated manufacturer information (e.g., MSDSs, product data sheets, etc.) shall be reviewed to identify organic hazardous constituents having a heat of combustion less than tetrachloroethylene (i.e., 2,141 BTU/lb). If any of these organic hazardous constituents are present, the waste shall be placed into permitted storage until an appropriate management option is identified by the Permittee and approved by the Executive Secretary. The results of the above analyses shall be documented in the Operating Record.

2.2.1.15.4. Non-agent contaminated hydraulic fluid and lubricating oil generated in the MDB shall be containerized and managed properly or transferred to the ACS tanks (e.g., via BDS) and subsequently treated in the LIC primary chambers. Before transfer to the ACS tanks, the container(s) shall be weighed (e.g., via BDS load cells or a calibrated scale in the TMA) and the contents shall be sampled and analyzed (ref: Table 2-0). The corresponding results shall be documented in the Operating Record.

2.2.1.15.5. Non-agent-contaminated hydraulic fluid and lubricating oil may also be pumped to the ACS tanks, via the SDS collection system, and processed in the LIC primary chambers. A sample shall be collected from the spent decontamination tank before it is transferred to the ACS tank (ref: Table 2-0) for analysis.

2.2.1.16. Reserved

2.2.1.17. **Reserved**

2.2.1.18 Secondary Waste Management

2.2.1.18.1 Each MPF charge interval and weight shall meet the limits for agent, halogens, ash, metals and BTU.

2.2.1.18.2 Noncombustible form core sandwich panels make up the outer walls of the MDB and concrete rubble generated during closure are not allowed to be processed until process for new waste streams from Module VI is followed and approved by the Executive Secretary.

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<#>GB agent bulk containers with a Portable Isotopic Neutron Spectroscopy (PINS) ratio less than or equal to 5.0 must be pretreated to remove the heavy metal containing solids before the drained and rinsed bulk containers are fed to the MPF and shipped off site in accordance with procedures specified in this attachment. This special handling rinse process is described in Attachment 14.¶
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The final volume of rinse water associated with each bulk container rinsed out by the special handling process will be sampled and analyzed for HRA metals (excluding Aluminum, Beryllium, and Boron).

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<#>Metal concentrations in the final rinse shall be less than or equal to the values listed in Table 2-2c below. The rinse sequence includes, at a minimum, a decontamination rinse, a process water rinse, a weak acid rinse, and a process water rinse. As a minimum, the acid rinse and final process water rinse will be repeated if the final rinse metals concentrations specified in Table 2-2c are not met.¶
¶
Table 2-2c¶
Special Handling Bulk Container¶
Final Rinse Metal Concentration Limits ... [1]

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2.2.1.17.1. VXH was generated by a RCRA treatability study that was performed at the Chemical Agent Munitions Disposal System (CAMDS). The study involved the in situ neutralization of Agent VX by the addition of approximately ten percent by weight water to VX ton containers that were previously stored in Area 10 and part of the DCD stockpile.¶
¶
2.2.1.17.2. Samples of VXH were collected from the first and last ton containers treated during the study. The analytical results of these samples are presented in Table 2-A-2-a. VXH will be processed in the MPF as if it were Agent VX due to the following facts. First, the VX used in the study was from the same ton container stockpile as that treated by TOCDF during the VX Campaign. Second, analytical results obtained throughout the VX Campaign for t ... [2]

2.2.1.18.3 Wastes containing metals must meet the requirements per Table V.C.1. by waste analysis if a sample can be obtained or by engineering evaluation based on manufacture literature. Manufacture information will be documented in the operating record.

2.2.1.18.4 Secondary wastes are in process once placed on a WIC, provided the WIC is located in the Lower Buffer Storage Area or the TMA A/B Area.

2.2.1.19 Agent Contaminated Sludge/Aqueous Wastes*

2.2.1.19.1 Waste is classified as sludge when it cannot be managed by the LIC system because of the inability to transfer to the ACS tanks. Sludge is generated from the maintenance of the ACS, AQS and SDS equipment maintenance and is managed separately from other secondary waste. Sludge is fed alone on a WIC. Sludge will be spread across the bottom of the WIC/container with a uniform thickness of less than 1.5 inches and verified prior to feeding into the MPF. Aqueous Waste* shall be fed to the MPF in 5-gallon container with fusible spout.

2.2.1.19.2 A representative sample of sludge shall be collected and analyzed prior to treatment in the MPF. The samples will be analyzed for HRA metals. Sampling and analysis is required for each WIC of sludge treated in the MPF.

2.2.1.19.3 Aqueous Wastes* are generated from the residue of the decontaminated drums of secondary waste and can either be processed through the LIC or processed in the MPF. If processed in the MPF, Aqueous Wastes shall be containerized and the containerized waste shall not be fed with other wastes on the WIC. The waste analysis requirements specified in Paragraph 2.2.1.19.2 shall be applicable to containerized Aqueous Waste treated in the MPF. The Aqueous feed rate shall not exceed the waste feed rate equivalent to the sludge feed rate.

2.2.2. **Analyses for Wastes Requiring Off-Site Treatment & Disposal**

2.2.2.1. The waste streams included in this section shall be transported off site for further treatment and ultimate disposal. The analytical parameters were selected based on process knowledge, TOCDF analytical data, and Land Disposal Restriction Notification requirements. The extraction method that will be used to determine Toxicity Characteristic parameter concentrations will be the Toxicity Characteristic Leaching Procedure (SW-846 Method 1311).

2.2.2.1.1. All waste streams included in this section (with the exception of the dunnage generated in the UPA, treated scrap metal, and liquids generated in SUMP 110) shall be characterized as F999 hazardous waste. Treated scrap metal is defined as metal from bulk containers, projectiles, and mortar rounds which has undergone thermal decontamination in the MPF under normal operating parameters and has no residue remaining internally or externally on the scrap metal. Treated scrap metal shall be managed in accordance with Section 2.2.2.7.6 of this attachment after approval from the Executive Secretary for each agent campaign. Each shipment of F999 waste transported off site shall be accompanied by a hazardous waste manifest.

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2.2.2.1.2. The Permittee shall determine the hazardous constituents in the waste streams to be treated off site. The Permittee shall also determine the underlying hazardous constituents as applicable in 40 CFR 268.9 and give proper notification with the hazardous waste manifest.

2.2.2.2. LIC Slag

2.2.2.2.1. The incineration of chemical agent and spent decontamination solutions in the LICs cause the generation of a “glass like” slag waste stream. Slag (in a molten state) accumulates in the secondary chambers of the LICs.

2.2.2.2.2. Each batch of slag shall be removed by tapping the slag extension of the secondary chamber and draining the molten slag into insulated drums or by chipping the solidified slag and placing the slag into containers. Each LIC secondary chamber is equipped with a view port that allows the operator to visually determine the slag level within the secondary chamber. The slag shall be removed before the slag level reaches the top of the view port.

2.2.2.2.3. Each batch of LIC slag generated shall be analyzed for TCLP metals after each re-bricking until the metal concentrations drop below the regulatory limits.

2.2.2.3. Treated M55 Rocket Parts/Fiberglass/Ash

2.2.2.3.1. Ash and debris collected at the DFS Heated Discharge Conveyor (HDC) output is generated during the treatment of M55 rockets and shall be analyzed for the chemical agent concentration, TCLP metals, TCLP organics, and PCBs. If analytical results demonstrate this waste to be Toxicity Characteristic for organics, this waste stream shall additionally be analyzed for dioxins/furans and explosives.

2.2.2.3.2. Solid residues resulting from the treatment of M55 rockets having more than two parts per million (ppm) PCB are a TSCA regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.3.3. The detoxification of waste residues exiting the DFS is maintained during upset conditions by features built into the control logic of the incinerator. When Automatic Waste Feed Cut-Offs (AWFCOs) are activated, the process control software causes the kiln to oscillate and the HDC to stop, when necessary, to prevent the discharge of waste residues until operating parameters associated with the kiln and HDC temperature and motion are restored. The kiln continues to rotate forward and HDC motion is maintained when AWFCOs that are not related to kiln and HDC temperatures (or motion) are activated. Table D-7-2 in Attachment 19 (Instrumentation and Waste Feed Cut-off Tables) shows the different AWFCO scenarios for the kiln and HDC.

2.2.2.3.4. In the event that waste is discharged from the HDC during an upset condition, the Permittee shall notify the Executive Secretary; document the circumstances in the Operating Record; analyze one sample taken from each HDC waste bin generated during the upset condition for agent concentration; and analyze a composite sample for PCBs (if PCBs are included in the DFS feed stream).

2.2.2.4. Treated Burster Casings/Fuse Bodies/Ash

2.2.2.4.1. During the projectile campaigns, residues collected at the DFS HDC output will consist of ash, empty burster casings and fuse bodies. The bursters are removed in the ECRs leaving the projectile's burster well intact and the projectile's agent cavity unopened. Projectile agent cavities are opened in the Munition Processing Bay (MPB) just prior to the agent draining process step.

2.2.2.4.2. Ash and debris generated from the incineration of bursters and fuses removed from projectiles/mortars shall be analyzed for agent concentration, TCLP metals, and TCLP organics.

2.2.2.5. Treated Mines/Fuse Bodies/Ash

2.2.2.5.1. VX mines shall be punched and drained of their chemical agent fill in ECR B. The drained mine body and the mine's associated energetic components shall then be fed to the DFS. During the VX mine campaign, DFS HDC residues will consist of mine bodies, fuse bodies, and ash.

2.2.2.5.2. The ash portion of this waste stream shall be analyzed for chemical agent concentration, TCLP metals, and TCLP organics.

2.2.2.5.3. In the event that waste is discharged from the HDC during an upset condition, the Permittee shall notify the Executive Secretary; document the circumstances in the Operating Record; and analyze one sample taken from each HDC waste bin generated during the upset condition for agent concentration.

2.2.2.6. DFS Cyclone Residues

2.2.2.6.1. DFS cyclone residues shall be analyzed per Table 2-1 for the parameters of chemical agent concentration, TCLP metals, and TCLP organics. If analytical results demonstrate this waste to be Toxicity Characteristic for organics, this waste stream shall additionally be analyzed for dioxins/furans and explosives.

2.2.2.6.2. DFS cyclone residues generated during M55 rocket processing shall additionally be analyzed for PCBs. Solid residues resulting from the treatment of M55 rockets having more than two ppm PCB are a TSCA regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.6.3. DFS cyclone residues having a chemical agent concentration below 20 parts per billion (ppb) for GB and VX, and 200 ppb for H/HD/HT, shall be transported to an off-site Subtitle C TSDF.

2.2.2.6.4. DFS cyclone residues having an agent concentration equal to or greater than 20 ppb for GB and VX, and 200 ppb for H/HD/HT shall be placed into permitted container storage until a treatment method is approved by the Executive Secretary.

2.2.2.7. Treated Bulk Containers/Projectiles/Mortar Rounds (Scrap Metal)

2.2.2.7.1. Each burn tray exiting the MPF undergoes an agent assessment to ensure adequate thermal treatment. The presence of chemical agent is determined by an Automatic Continuous Air Monitoring System (ACAMS) located at the MPF discharge airlock. If chemical agent is detected above 0.5VSL, the munitions/bulk containers are moved back into the MPF to undergo further thermal treatment. Munitions/bulk containers will be processed through the discharge airlock in accordance with Module V, VI, and Attachment 22 using either high temperature or low temperature monitoring of the discharge airlock.

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2.2.2.7.2. The MPF is designed with double-door airlock systems located on both the charge and discharge end of the primary combustion chamber (PCC). These systems prevent PCC combustion gases and agent vapors from being discharged to the MDB or the atmosphere when burn trays are charged and discharged respectively.

2.2.2.7.3. The MPF primary combustion chamber is divided into three zones. Treatment through the MPF requires that each burn tray charge remain in each zone for a preset period of time as specified in Module V. When a burn tray advances to the discharge airlock, one zone must remain empty while the ACAMS in the discharge airlock is used to monitor the treated munition(s

2.2.2.7.4. While in the discharge air lock, the contents of the burn tray are monitored for the presence of chemical agents using ACAMS. The burn tray remains in the MPF discharge airlock for the ACAMS to monitor two complete cycles.

2.2.2.7.5. If chemical agent is detected at or above the action level of 0.5VSL, the burn tray in the MPF discharge airlock is moved back into Zone 3 (or Zone 2 if the MPF is in a two-zone operation) for additional processing. If no agent is detected, the burn tray exits the MPF discharge airlock by being advanced to the MPF cool-down conveyor. Flaming or smoking munitions/bulk containers or waste trays shall be placed back into the discharge airlock for additional processing.

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2.2.2.7.6. Following approval of a test plan and report for mustard scrap metal, the Permittee may : (1) manage such scrap metal by recycling exclusively by smelting; or (2) manage as a hazardous waste and dispose of at an off-site Subtitle C TSDF. For disposal, manifest requirements shall be followed. F999 scrap metal shall be managed as a hazardous waste and disposed at an approved, off-site Subtitle C TSDF.

Deleted: Treated GB scrap metal shall be sent off site and shall be

2.2.2.7.7 Scrap metal shall be managed as an F999 waste and be transported with a hazardous waste manifest describing waste as an F999 Utah listed hazardous waste until verification testing has been accepted. Before shipment of scrap metal, residue in the interior and on the exterior of the scrap metal shall be removed (e.g., vacuumed) and visually verified as clean. The residue removed shall be analyzed and managed according to the requirements described below for the MPF Burn Tray, WIC and CTC residues (ref: section 2.2.2.9). Any treated scrap metal that contains residue that cannot be removed shall be considered a F999 waste and the requirements specified in paragraph 2.2.2.7.6 (2) shall be followed.

2.2.2.8. MPF Treated Debris

2.2.2.8.1. Pre-filters, HEPA filters, carbon filter trays (from which the carbon was removed prior to treatment in the MPF), munition overpacks, shipping containers, process equipment, and tools are treated in the MPF to remove surface contamination.

2.2.2.8.2. Each burn tray, WIC or CTC exiting the MPF is analyzed for chemical agent as described in Attachment 2 (Waste Analysis Plan) and Attachment 22 (Agent Monitoring Plan).

2.2.2.8.3. This MPF treated debris waste stream shall be managed separately from the scrap metal waste stream and shall not be recycled, with the exception of the following miscellaneous metal wastes; munition overpacks, piping, conveyors, drain probes, and shear blades. Miscellaneous metal wastes may be treated as scrap metal and recycled in accordance with paragraphs 2.2.2.7.6 and 2.2.2.7.7.

2.2.2.9. MPF Burn Tray, WIC and Cutaway Ton Container Residues

2.2.2.9.1. An inspection of the residue will be performed per criteria approved by the Executive Secretary. If the inspection criterion is met demonstrating complete treatment, then the waste will be sampled and analyzed, if required, and managed off-site. If the residue does not meet the criteria, the residue will be drummed and placed in storage for further processing. The MPF residues generated shall be analyzed due to the variability of the waste steams. Additional sampling is necessary to ensure compliance with the 40 CFR 268.7 to identify underlying hazardous constituents that may be present in the residue that could prevent land disposal.

2.2.2.9.2. Each shipping container (i.e., drum or roll-off, which ever is used) generated will be sampled. The samples will be screen for the agents contaminating the wastes. To determine applicable Toxicity Characteristics, samples will be additionally analyzed for TCLP metals and organic. To determine the presence of underlying hazardous constituents, samples will also be analyzed for metals as specified in Table 2-4a (note Toxicity Characteristic metals are a subset of this list), total volatile organic as specified in Table 2-4b, and total semi-volatile organics as specified in 2-4c. The volatile and semi-volatile organic analytes specified in Tables 2-4b and 2-4c were selected base on their potential to be present in the residue as products of incomplete combustion.

2.2.2.9.3. The residue waste stream resulting from the MPF incineration treatment of secondary waste shall be managed separately from the munitions metal residues and shall not be recycled. This waste stream shall be shipped to an approved hazardous waste facility for disposal.

2.2.2.10. MPF Munitions and Ton Container Residues

2.2.2.10.1 MPF munitions and ton container residues will be composed primarily of incinerated paint flakes and residues removed from the interior of the munition and ton containers. Residues shall be removed from each ton container or munition and managed as hazardous waste separately from scrap metal.

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2.2.2.10.2 MPF munitions and ton container residues shall be analyzed for chemical agent concentrations, HRA metals, TCLP metals and TCLP organics.

2.2.2.11 Incinerator Refractory

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2.2.2.10.1 After treatment in the MPF, Spray Tank nose cones will be removed from the Spray Tank body. The nose cones shall be properly managed at an off-site Subtitle C TSDF with the appropriate waste codes (e.g., F999, D008, and other waste codes that may apply.¶

2.2.2.11.1 Upon change out, the discarded refractory lining of the incinerator primary and secondary chambers shall be analyzed for TCLP metals and properly managed.

2.2.2.12 PAS Residues

2.2.2.12.1 PAS residues are comprised of scrubber brine precipitate and filter elements. The precipitate is collected in the bottom of the PAS process vessels (i.e., the quench towers, packed bed scrubbers, and demister vessels), and the PAS brine filters.

2.2.2.12.2 The PAS residues are of a similar composition to that of the scrubber brine salts (the waste stream generated from drying the scrubber brines in the BRA evaporators and drum dryers).

2.2.2.12.3 The PAS residues shall be analyzed for the parameters of chemical agent concentration, corrosivity (pH), free liquids, TCLP metals, and TCLP organics.

2.2.2.12.4 DFS PAS residues generated during the processing of M55 rockets shall also be analyzed for PCBs. Solid residues having more than two ppm PCB are a TSCA-regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.13 Spent Scrubber Brines

2.2.2.13.1 Scrubber brines are removed from the PAS as they are generated by the process control equipment. Spent scrubber brines shall be stored in BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, and BRA-TANK-202.

2.2.2.13.2 In the event the on-site treatment capacity of the BRA is exceeded because the BRA is inoperable or the scrubber brine generation exceeds the capacity of the BRA, the Permittee shall ship the excess scrubber brines to an off-site TSDF for further treatment and ultimate disposal.

2.2.2.13.3 Spent scrubber brines from each BRA tank to be transferred off site for further treatment and ultimate disposal shall be analyzed for chemical agent concentration, corrosivity (pH) and specific gravity.

2.2.2.13.4 On a monthly basis or each munitions campaign change, whichever is sooner, a composite sample comprised of a sample from each BRA Tank shall be analyzed for TC metals and TC organics. This analysis is to confirm the current waste profile for scrubber brines. The brine from which the confirmatory sample was taken may be shipped off site under the current brine waste profile.

2.2.2.13.5 For Subpart CC VOC demonstration compliance, spent scrubber brines shall be sampled as the tank is being filled as required in Table 2-1 and specified by Section 2.10.

2.2.2.13.6 Spent scrubber brines shall only be shipped off site for further treatment and ultimate disposal if the agent concentration in the brines is below 20 ppb for GB and VX, and 200 ppb for Mustard.

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2.2.2.13.7 Spent scrubber brines transferred off site shall also be analyzed for PCBs, if the brines are generated from the processing of M55 rockets. Scrubber brines having more than three ppb PCB are a TSCA-regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.14 SDS Tank Sludges

2.2.2.14.1 Filters associated with the SDS tanks collect solids that have precipitated out of spent decontamination solution. The sludge removed from the filters associated with the SDS tanks shall be analyzed for chemical agent, corrosivity (pH), free liquids, explosives, TCLP metals, and TCLP organics.

2.2.2.14.2 SDS tank sludges shall only be shipped off site for further treatment and ultimate disposal if the agent concentration in the sludges is below 20 ppb for GB and VX, and 200 ppb for Mustard. If the agent concentration is found to be greater than or equal to these values, decontamination solution shall be added to the accumulation container and the analysis for chemical agent, pH, and free liquids shall be repeated.

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2.2.2.14.3 Sludges from SDS sumps located outside of the ECRs shall be managed in accordance with Paragraphs 2.2.2.14.1 and 2.2.2.14.2.

2.2.2.15 BRA Tank Sludges

2.2.2.15.1 Between agent campaigns, the scrubber brine sludge which has collected in the BRA tanks is removed. During scheduled maintenance of a BRA tank, scrubber brine sludge may be removed.

2.2.2.15.2 BRA tank sludges shall be analyzed for agent concentration, pH, free liquids, TCLP metals, and TCLP organics.

2.2.2.15.3 BRA tank sludges generated during M55 rocket campaigns shall be analyzed for PCBs.

2.2.2.15.4 Waste residues containing liquids having a PCB concentration greater than three ppb PCB are a TSCA-regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.16 PAS Demister Candle Sleeves

2.2.2.16.1 Prior to shipment, the demister candle sleeves from each PAS shall be analyzed for chemical agent concentration, TCLP metals and TCLP organics.

2.2.2.16.2 Demister candle sleeves generated by the DFS PAS during the processing of M55 rockets shall be analyzed for PCBs. Demister candle sleeves having more than two ppm PCB are a TSCA-regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.17 Scrubber Brine Salts

2.2.2.17.1 Scrubber brine salts are generated by concentrating the brines in the BRA evaporators and by evaporating the concentrated brine in the BRA drum dryers.

2.2.2.17.2 Scrubber brine salts shall be analyzed for chemical agent concentration, pH, free liquids, TCLP metals and TCLP organics.

2.2.2.17.3 Scrubber brine salts generated during the processing of M55 rockets shall be analyzed for PCBs. Solid residues having more than two ppm PCBs are a TSCA-regulated waste and shall be managed at an approved TSCA TSDF.

2.2.2.18 BRA PAS Knockout Box Residues

2.2.2.18.1 A component of the BRA PAS is a knockout box. The function of this equipment is to remove excess moisture from the exhaust streams of the BRA drum dryers and evaporators. The knockout box is located in the same room as the BRA evaporators and drum dryers.

2.2.2.18.2 Residues from the knockout box shall be analyzed for chemical agent concentration, pH, free liquids, TCLP metals, and TCLP organics. Residues generated during the processing of M55 rockets shall also be analyzed for PCBs.

2.2.2.19 BRA PAS Baghouse Residues

2.2.2.19.1 BRA PAS baghouse residues shall be analyzed for chemical agent concentration, pH, free liquids, TCLP metals, and TCLP organics. The residues shall be properly managed as hazardous waste. Residues generated during the processing of M55 rockets shall also be analyzed for PCBs.

2.2.2.20 Dunnage Generated in the Unpack Area (UPA)

2.2.2.20.1 The initial waste characterization of dunnage received in the UPA is based on a determination by Area 10 personnel.

2.2.2.20.2 UPA personnel shall use ONC/overpack agent monitoring to determine if dunnage has become contaminated during transport to TOCDF. Dunnage present in ONCs/overpacks having agent monitoring results of 0.5 VSL or greater shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.1.11.2.

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2.2.2.20.3 Samples of dunnage (that have not been declared hazardous waste by Area 10) shall be taken in accordance with Table 2-1 from ONCs/overpacks that monitor below 0.5 VSL and do not contain leaking munitions. If an analysis of representative samples of dunnage shows agent concentrations at or above the WCL, the dunnage shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.1.11.2. If the agent analytical results show the agent concentration is below the WCL and exhibits no hazardous waste characteristics or listings, the dunnage is not considered a listed hazardous waste.

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2.2.2.21 DPE Suits

2.2.2.21.1 Demilitarization Protective Ensemble (DPE) suits are encapsulating supplied air PPE worn by personnel required to enter areas in the MDB where agent liquid or vapors are known to exist. DPE suits are made of a mixture of PVC, chlorinated polyethylene resins, plasticizers, and metal stabilizers, as opposed to the Army Level A Suits that are made of butyl rubber. Each suit is decontaminated before the "Entrant" is removed from the suit. The decontaminated suits are bagged in containers (typically plastic bags, with two to three suits per bag).

2.2.2.21.2 Discarded DPE Suits shall be characterized as P999 or F999 hazardous waste based on generator knowledge, agent monitoring, and sample analytical results.

2.2.2.21.3 DPE Suits that are not monitored for agent shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.2.21.7.

2.2.2.21.4 DPE Suits may be characterized as F999 hazardous waste if the agent monitoring results of the volume of air within the suit's container shows an agent concentration less than 0.2 VSL and the requirements specified in paragraph 2.2.2.21.9 through 2.2.2.21.10 are met.

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2.2.2.21.5 Containers of DPE suits having agent-monitoring results equal to or greater than 0.2 VSL shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.2.21.7.

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2.2.2.21.6 DPE suit samples shall be collected from the section of the suit most likely to become contaminated while being worn by the wearer rubbing up against agent-contaminated equipment, that is, the front-lower mid-section of the suit. Samples of DPE suits passing the agent monitoring shall be sampled and analyzed at a frequency of twenty percent of the DPE suits or one sample per container, whichever is greater.

2.2.2.21.7 DPE suits to be managed as a P999 listed hazardous waste may be treated in the MPF based on the results of the MPF Secondary Waste Demonstration Test, or treated at the CAMDS Material Decontamination Chamber-2 (MDC-2) in accordance with the CAMDS Hazardous Waste Permit, or both. The treated DPE suits shall be managed off site as an F999 hazardous waste if the agent concentration is below 20 ppb for GB and VX and 200 ppb for mustard (other waste codes may apply).

2.2.2.21.8 DPE suits that have been treated in the MDC-2 at CAMDS shall be sampled and analyzed, and shipped off site in accordance with the CAMDS Hazardous Waste Permit or may be returned to the Permittee and managed as F999 waste if analysis of an extract made from samples of the DPE suits demonstrates that agent in the extract is below 20 ppb for GB and VX, and 200 ppb for Mustard or may be returned to the Permittee and managed as F999 waste in accordance with 2.2.2.21.9 through 2.2.2.21.10.

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2.2.2.21.9 DPE suits may be managed off site as an F999 listed hazardous waste if the requirements of paragraph 2.2.2.21.4. are met and an analysis of an extract prepared from a sample of the suits is below 20 ppb for GB and VX and 200 ppb for Mustard.

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2.2.2.21.10 DPE suits shipped off site as F999 hazardous waste shall be managed at a Subtitle C TSDF.

2.2.2.22 Spent Non-Agent Contaminated MDB Equipment Hydraulic Fluid and Lubricating Oil

2.2.2.22.1 Spent hydraulic fluid and lubricating oil generated in the MDB to be transported off site for treatment shall be analyzed for chemical agent concentration, HRA metals, and TCLP organics.

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2.2.2.22.2 MDB-generated spent hydraulic fluid and lubricating oil having agent concentrations less than 20 ppb for GB and VX, and 200 ppb for Mustard may be managed at an off-site Subtitle C TSDF or treated in the primary chamber of one of the LICs in accordance with Section 2.2.1.15.

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2.2.2.22.3 MDB-generated spent hydraulic fluid and lubricating oil contaminated with chemical agent at or above 20 ppb for GB and VX, and 200 ppb for Mustard, shall be managed in accordance with Section 2.2.1.15.

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2.2.2.22.4 The failure of a mechanical system inside the MDB could result in the generation of fluids contaminated with chemical agent and be commingled with spent decontamination solution. These fluids shall be collected in sumps and transferred to SDS-TANK-101, SDS-TANK-102 or SDS-TANK-103 and managed as described in Section 2.2.1.4 or 2.2.2.28.

2.2.2.22.5 Rags and absorbent materials from cleanup of hydraulic fluid and lubricating oil spills shall be characterized and managed appropriately.

Reserved

2.2.2.24 CAL Aqueous Wastes

2.2.2.24.1 Operation of analytical equipment within the CAL results in the generation of an aqueous waste stream.

2.2.2.24.2 CAL aqueous waste shall be analyzed for agent concentration, corrosivity (pH), ignitability, TC metals, and TC organics.

2.2.2.24.3 CAL aqueous wastes may be transported off site for further treatment and ultimate disposal at a Subtitle C TSDF only if the agent concentration in the waste is below 20 ppb for agents GB and VX, and 200 ppb for agent Mustard.

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2.2.2.25 CAL Solid Wastes (debris)

2.2.2.25.1 CAL generated solid wastes consist of but are not limited to discarded glassware, wipe cloths, paper, PPE, plastic, wood, pipet tips, DAAMS tubes, transfer tubes, silver-fluoride pads, discarded analytical equipment components, and vermiculite.

2.2.2.25.2 Each individual item comprising this waste stream is decontaminated before it is placed into the accumulation container. Over time as the container is filled, decontamination solution residues (that once clung to the item) collect in the bottom of the container. A sample of this residual decontamination solution shall be taken from the bottom of each container of CAL solid debris generated and analyzed for chemical agent.

2.2.2.25.3 Containers having analytical results demonstrating the agent concentration in the decontamination solution is below 20 ppb for GB and VX, and 200 ppb for Mustard shall be classified as F999 listed hazardous wastes.

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2.2.2.25.4 Containers having final analytical results demonstrating the agent concentration in the decontamination solution is at or above 20 ppb for GB and VX, and 200 ppb for Mustard shall be placed into permitted storage until the Executive Secretary approves a treatment plan.

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2.2.2.26 MSB Solid Waste (debris)

2.2.2.26.1 MSB generated solid wastes consist of but are not limited to wipe cloths, PPE, discarded monitoring system components, tygon tubing, silver-fluoride pads, DAAMS tubes, pre-concentrator tubes, and discarded analytical equipment.

2.2.2.26.2 This waste stream shall be sampled, analyzed, and managed as described in paragraphs 2.2.2.25.2 through 2.2.2.25.4

2.2.2.27 Sump 110

2.2.2.27.1 Sump 110 is a collection sump designed to receive precipitation run-off collected on the incinerator PAS concrete pads. In the event of a PAS process equipment leak, the potential exists for Sump 110 to also accumulate incinerator PAS liquids/solids (e.g., scrubber brines). These liquids/solids generated from the treatment of chemical agents and chemical agent munitions are a listed hazardous waste in Utah.

2.2.2.27.2 If the material (either liquid or solids) accumulated in Sump 110 is to be transferred off site for treatment and/or disposal, a sample of the material shall be analyzed for agent concentration, pH, TCLP metals, and TCLP organics. If the agent concentration is below 20 ppb for GB or VX, or below 200 ppb for Mustard, then the material may be transferred off site for treatment and/or disposal.

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2.2.2.27.3 Unless the Permittee can demonstrate in accordance with R315-2-3(d) that the material removed from the sump is not a hazardous waste, the material shall be managed as a hazardous waste.

2.2.2.27.4 To determine if liquid collected in Sump 110 shall be treated on site or transferred off site for further treatment and disposal, the liquids shall be visually inspected for the presence or absence of a surface oil sheen. Sump 110 liquids having a surface oil sheen, which is evidence that organics were mixed with the sump contents, shall not be transferred to the BRA for on-site treatment.

2.2.2.27.5 When material accumulated in Sump 110 is transferred off site in tankers, the material in each tanker shall be sampled and analyzed for pH, TCLP metals and TCLP organics. The material shall also be analyzed to confirm that agent concentrations are at or below either 20 ppb for GB and VX, or 200 ppb for Mustard.

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2.2.2.27.6 If no surface oil sheen is visually present on the liquid accumulated in Sump 110, the liquid may be transferred to one of the BRA-Tanks. Any solid material removed from the sump shall be managed as a hazardous waste.

2.2.2.27.7 Instead of off-site treatment/disposal, the liquid accumulated in Sump 110 may be transferred to one of the BRA-Tanks provided no surface oil sheen is visually present. Likewise, any solid material removed from the sump may be containerized and then stored and/or treated on site.

2.2.2.28 Spent Decontamination Solutions

2.2.2.28.1 Sodium hydroxide-based spent decontamination solutions generated during the GB campaign may be treated on site by incineration or shipped off site for disposal. The decontamination solutions used for VX and mustard agent campaigns shall be incinerated on site. Each tank of spent decontamination solution collected in SDS-TANK-101, SDS-TANK-102, and SDS-TANK-103 shall be analyzed for chemical agent concentration, corrosivity (pH), specific gravity, BTU (heat content), ignitability, total halogens, total organics, explosives and HRA metals. The purpose of the organic analysis is to confirm that the spent decontamination solution waste streams were properly segregated from other waste streams.

2.2.2.28.2 If chemical agent concentrations are below 20 parts per billion (ppb) for GB, then the GB spent decontamination solution may be shipped off site for disposal. If chemical agent is detected at or above 20 ppb, additional decontamination solution shall be added to the SDS tank, the contents of the tank shall be recirculated (i.e., mixed) and another sample analyzed.

2.2.2.28.3 Before transfer to tanker trucks, the 90-day tank shall be analyzed for chemical agent concentrations, pH, and specific gravity. Once the sample is taken, no additional spent decontamination solution may be added to the 90-day tank.

2.2.2.28.4 In addition to the above, the following restrictions shall apply to off-site shipments:

2.2.2.28.4.1 The TOCDF shall impose contractual restrictions on the transporters and off-site management facilities to ensure that the spent decontamination solutions are directly fed into an incinerator from either the tanker truck or tank(s) dedicated to storing only this waste stream; no commingling of waste streams.

2.2.2.28.4.2 The TOCDF shall impose contractual restrictions on the transporters and off-site management facilities to ensure the spent decontamination solution pH is not lowered in each tanker or in the off-site tank(s) dedicated to storing only this waste stream.

2.2.2.28.4.3 The off-site treatment facilities to which the TOCDF may ship are limited to hazardous waste incineration facilities.

2.2.2.28.4.4 The off-site transporters and management facilities shall be trained in chemical agent exposure and spill response before shipment.

2.2.2.29 Residues Resulting from the Special Handling of GB Agent Bulk Containers

2.2.2.29.1 Waste resulting from the treatment of bulk containers requiring special handling include the successfully rinsed out containers that have been processed through the MPF, liquid rinsate (i.e., spent decontamination solution), and rinsate solids. The MPF processed bulk containers will be managed as specified in Section 2.2.2 of this attachment.

2.2.2.29.2 Special handling rinse material will be accumulated and treated in accordance with R315-5-3.34. The solutions and suspended solids resulting from each bulk container rinse are collected and mixed in the Conditioning and Settling System (CSS). The pH of the rinsate will be adjusted above 9 using sodium hydroxide to ensure agent neutralization and then will be lowered as necessary for optimum metals precipitation.

2.2.2.29.2 The pH adjusted rinsate will be transferred to a settling device where the heavy metals fall out of solution, allowing the liquid and solid residues to be separated. After settling is complete, the separated liquids will be transferred to the SDS Tanks and managed as spent decontamination solution. Spent decontamination management requirements are specified in Sections 2.2.1.4 or 2.2.2.28 of this attachment.

2.2.2.29.3 Spent decontamination solutions from the CSS that are incinerated on site shall be fed to the Liquid Incinerator (LIC) Secondary Chambers in accordance with the metal feed rates specified for the LIC primary chambers. Spent decontamination solutions from the CSS and chemical agent shall not be fed at the same time.

2.2.2.29.4 Solids generated from the CSS will be analyzed for agent concentration, TCLP metals, and TCLP organics. Waste found to have an agent concentration greater than the WCL will be treated with additional decontamination solution until the agent is destroyed. These analyses will be performed once each time the conditioning device or settling device is cleaned out. These solids will be shipped off site to a Subtitle C TSDF.

2.2.2.30 Reserved

2.2.2.31 Non Agent Contaminated Mine Drums

2.2.2.31.1 Each individual mine drum will be assigned a unique identifying number for tracking purposes. The status of each mine drum, including the criteria listed below, will be tracked on appropriate forms and documented in the Operating Record.

2.2.2.31.2 Mine drums, lids, rings, and packing material that have not been contaminated by agent will be transported off-site and managed as a non-RCRA waste. The mine drums may be crushed in the UPA to facilitate loading and transport. To be considered uncontaminated, all of the following conditions shall be satisfied:

2.2.2.31.2.1 The waste material was not associated with leakers;
2.2.2.31.2.2 The operators inspect the interior of each mine drum when unpacking and no liquid is detected when removing the mines from the associated mine drums;
2.2.2.31.2.3 The ACAMS readings for the ECV were less than 0.5 TWA for VX during the time the mine drums were unpacked in the ECV; and
2.2.2.31.2.4 The waste material was monitored in the airlock between the ECV and the UPA and was shown to be less than 0.5 TWA for VX.

2.3 PARAMETER TEST METHODS R315-8-2.4 [40 CFR 264.13(b)(2)];

Deleted: GB Agent Bulk Containers Failing Special Handling

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¶
<#>An analysis will be performed on failed bulk containers to ensure there will be no environmental or health impacts resulting from their off-site management. Samples of the final rinse volume and any solids remaining in the bulk container will be taken. The final rinse volume will be analyzed for pH and agent. The solids will be analyzed for TCLP metals, TCLP organics, and agent.¶
¶
<#>Bulk containers failing the special handling process will be shipped to an off-site Subtitle C TSDF provided the agent analytical results for the final rinse and solids sampling show the agent concentrations to be less than 20 ppb.¶
¶

2.3.1 Table 2-3 provides a listing of the analytical methods that shall be used to detect and quantify the selected parameters. This information is presented in a relational format in Tables 2-0 and 2-1 (the WAP Summary Tables).

2.3.2 The on-site Chemical Assessment Laboratory (CAL) shall perform the analyses related to chemical agent and other CAL-assigned analyses listed in Tables 2-0 and 2-1.

2.3.3 The CAL shall be Utah-certified to perform analyses for the parameters that require Utah certification.

2.3.4 Off-site analyses shall be performed by a Utah-certified laboratory for the parameters listed in Table 2-3.

2.3.5 The off-site laboratories selected shall be certified by the State of Utah for the methods referenced in this waste analysis plan. When new promulgated methods are approved by EPA, the Permittee shall notify the off-site laboratories of the required change and request a time frame of when the change will occur. A laboratory will have six months to submit documentation to the Permittee of the change or a time frame when the change will be completed. The laboratory must use the most recently approved method within one year of promulgation. If that is not possible, a written request for extension must be provided to the Executive Secretary for approval. Only SW-846 promulgated methods shall be used unless an alternate method is approved by the Executive Secretary.

2.4 SAMPLING METHODS R315-50-6 [40 CFR 264.13(b)(3)];

2.4.1 The sampling methods to be used for each waste stream are found in Tables 2-0 and 2-1 (the WAP Summary Tables).

2.5 FREQUENCY OF ANALYSES R315-8-2.4 [40 CFR 264.13(b)(4)];

2.5.1 The frequencies at which each waste stream shall be sampled and analyzed are found in Tables 2-0 and 2-1 (The WAP Summary Tables).

2.6 ADDITIONAL REQUIREMENTS FOR WASTES GENERATED OFF SITE R315-8-2.4 [40 CFR 264.13(b)(5)];

2.6.1 The Permittee is not permitted to store or treat waste generated off site. The Permittee is only permitted to store and treat wastes generated by the facility having EPA ID Number UT5210090002.

2.7 ADDITIONAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES R315-8-2.8 [40 CFR 264.13(b)(6)];

2.7.1 The Permittee shall comply with R315-8-2.8 for management of ignitable, reactive, or incompatible wastes.

Deleted: The facility area map found in Attachment 1 (Facility Description) of this Permit shows the locations of the permitted container storage HWMUs associated with the TOCDF

2.8 RECORDKEEPING REQUIREMENTS R315-8-5.3 [40 CFR 264.73(b)(3)];

2.8.1 In accordance with Module II.I, analytical results generated in compliance with Attachment 2 (Waste Analysis Plan) shall be maintained on file at the TOCDF as part of the Operating Record.

2.9 SAMPLING AND ANALYSIS QA/QC PROCEDURES

2.9.1 The Laboratory Quality Control Plan in Attachment 3 describes the Quality Assurance/Quality Control procedures established at the TOCDF to ensure integrity and accuracy of the waste sampling and analysis effort.

2.10 SUBPART CC AND BB SAMPLING AND ANALYTICAL PROCEDURES

2.10.1 The Permittee shall perform initial or change-of-process waste determinations for hazardous waste listed in Tables 2-0 and 2-1 for wastes managed in containers, primary containment sumps, and tanks identified in Table 2 entitled "Hazardous Waste/Permitted Hazardous Waste Management Units" and Table 4 entitled "Hazardous Waste Sump Systems". These determinations shall be made at the points of waste origination for average VOCs before the first time any portion of the waste stream is placed in an applicable container, primary containment sump, and tank system.

2.10.2 The average VOC is the mass-weighted average of a hazardous waste as made in accordance with Section 2.10.1. The Permittee may choose from the two following sets of requirements for waste determinations:

2.10.2.1Direct measurements or methods specified in Table 2-3 or

2.10.2.2Knowledge-based determinations.

2.10.3 Waste determinations for VOC through direct measurements shall document the point of waste origination and the average VOC for an averaging period. The averaging period for all waste streams shall be designated and documented in the Operating Record. The averaging period can represent any time interval that the Permittee determined is appropriate for each hazardous waste stream of this section, but shall not exceed one year.

2.10.4 Direct sample measurements shall be taken at the points of waste generation in manner to eliminate volatilization, biodegradation, reaction, or sorption during the sample collection storage and preparation steps. For ACS and SDS tank systems, the point of origination shall be considered the tank. A minimum of four samples shall be collected at the points of origination for applicable waste streams identified in this attachment. All samples for a given waste determination shall be collected within a one-hour period. The average of the four sample results constitutes a waste determination for the waste stream. All samples used for waste analysis shall be representative of the highest VOC.

2.10.5 All samples shall be collected and analyzed in accordance R315-7-30 [40 CFR 265.1084], Attachment 3 (Sampling, Analytical, and QA/QC Procedures), and this Attachment.

2.10.6 The Permittee may also apply other methods and requirements of R315-7-30 [40 CFR 265.1084(a)(3)] for samples collected and analyses to determine VOC, provided the methods are approved by the Executive Secretary as required by R315-3-4.

2.10.7 All direct measurements used for sampling and analytical results which require implementation of Module X and Section 2.10, Subpart CC waste analysis requirements shall be documented in the Operating Record and shall include the following:

2.10.7.1 Point of waste generation
2.10.7.2 Averaging period

2.10.7.3 Sampling plan used (See 40 CFR 265.1084(b)(3)(ii)(C))
2.10.7.4 Date, time, and location where the samples were collected (40 CFR 264.1089(f))
2.10.7.5 Quality assurance program including procedures to minimize loss of organics during sampling and measurement of accuracy of procedures (40 CFR 265.1084(a)(3)(iii)(F))
2.10.7.6 Analytical method used (40 CFR 264.13(b))
2.10.7.7 Identification of the analyst who performed the analytical tests, and Analytical operating conditions.

2.10.8 Knowledge-based determinations may be used for making waste determinations provided that there is sufficient information to meet the requirements found in R315-8-22 [40 CFR 265.1084(a)(4)].

2.10.9 The Permittee shall make and update all analytical determinations required by Section 2.10 annually or prior to an agent campaign change for waste streams identified in this Attachment.

2.10.10 For waste streams identified in Tables 2-0 and 2-1 that are determined during sampling to have VOC above 500 ppm and are not managed with air emission controls as required by R315-8-22 [40 CFR 264.1084 through 264.1087], the Permittee shall notify the Executive Secretary of each occurrence of non-compliance and prepare plans for the adoption of air emission control requirements or waste determinations as required by this section.

2.10.11 The maximum organic vapor pressure waste determinations shall be performed by either direct measurement or knowledge of the waste prior to the first time hazardous waste is placed in the tank unit. Waste determinations for tank systems listed on Table 2 entitled "Hazardous Waste/Permitted Hazardous Waste Management Units" shall be performed as specified by R315-8-22 [40 CFR 265.1084(c)] for tank systems using Level One control.

2.10.12 Direct measurements for maximum organic vapor pressure shall be one of the following:

2.10.12.1 Method 25E in 40 CFR 60, Appendix A;

2.10.12.2 ASTM Standard Test Method for Vapor Pressure, ASTM 2879-92 (40 CFR 260.11).

2.10.13 Knowledge of the waste for maximum organic vapor pressure shall be determined in accordance with Paragraph 2.10.11.

2.10.14 As indicated below, the following wastes and waste management units are exempt from certain Subpart CC and sampling and analytical requirements of this Section:

2.10.14.1 Hazardous waste that has been treated or reduced by an organic destruction or removal process that satisfies any one of the requirements and conditions of R315-8-22 [40 CFR 264.1082(c)] is not subject to waste analysis requirements of Section 2.10.

2.10.14.2 Hazardous waste and residues, which are to be managed in containers, sumps, and tanks, which are complying with the air emission control standards of R315-8-22 [40 CFR 264.1084 through 1087] are not subject to waste analysis requirements of Section 2.10.

2.10.14.3 Wastes which are collected subject to chemical events, and discharges of wastes subject to spill clean-up requirements are not subject to the waste analysis requirements of Section 2.10.

2.10.14.4 The sumps and tank systems that must meet Level Two air emission control standards specified by R315-8-22 [40 CFR 264.1084(b)(2)] are not subject to maximum organic vapor pressure determinations of Section 2.10.

2.10.14.5 Wastes that satisfy the requirements specified in R315-8-22 [40 CFR 264.1082(c)(4)] are not subject to waste analysis requirements of Section 2.10.

2.10.15 The Permittee shall perform required waste analysis determinations for Subpart BB equipment identified in 40 CFR 264.1052 through 264.1062, that contains or contacts hazardous waste with organic concentrations that equal or exceed 10 percent by weight using the analytical methods listed in Table 2-0 and Table 2-1 by either direct measurement or by using knowledge-based determinations in Section 2.10.19.

2.10.16 Direct measurements shall be obtained by collecting Subpart BB samples and performing an analysis as specified by Section 2.10.5 to determine organic concentration levels for equipment.

2.10.17 All samples and analysis results required by Section 2.10.19.2 shall be documented in the Operating Record.

2.10.18 All analytical samples collected shall be representative of the highest total organic content of hazardous waste that contacts equipment.

2.10.19 Application of knowledge of the nature of the waste or the process may be used for waste determination for Subpart BB equipment, provided that the Permittee documents the waste determination by one of the following procedures:

2.10.19.1 A demonstration that shows that no organics are used or are in contact with the equipment at a particular point in the process.

2.10.19.2 Direct measurement data for waste streams listed in Table 2-0 and 2-1 may be used for equipment in contact with an identical hazardous waste stream that contains a total organic concentration of less than 10 percent by weight. If direct measurement methods are used to supplement knowledge-based determination, the following shall be maintained:

2.10.19.2.1 The analytical method

2.10.19.2.2 Sampling procedures

2.10.19.2.3 Sample variability

2.10.19.2.4 Analytical variability associated with the test method that was used [40 CFR 265.1084(a)(4)]

2.10.19.2.5 Location of sample collection

2.10.19.2.6 Date and times samples were taken

2.10.19.3 If knowledge is to be used instead of the specified test method for a specific waste, then the following shall be documented in the Operating Record to support the knowledge-based determination:

2.10.19.3.1 Organic material balances of the source generating the waste or

2.10.19.3.2 Previous organic constituent test data or

2.10.19.3.3 Any other information, including but not limited to manifests, shipping papers, and waste certification notices.

2.10.20 Samples collected for leak detection monitoring requirements specified by Module X.C and X.D, shall be obtained to meet the performance standards of 40 CFR 60, Method 21. Monitoring requires that samples be taken in close proximity to the Subpart BB Equipment, and documented exceedance of Method 21. Sampling shall be performed in accordance with the frequencies established by Module X.C.

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	Preparation and ANALYTICAL METHODS[1,5]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.3. Chemical Agent (Initial Waste Profile)	LIC 1 LIC 2 MPF	Based on an Approved Agent Sampling and Analysis Plan.	Based on an Approved Agent Sampling and Analysis Plan	Prior to agent campaign, sampling/analysis requirements based on agent specific sampling plan.	Based on an Approved Sampling and Analysis Plan
		(Baseline Ton Containers Only) HRA Metals	TE-LOP-584 3050B/6010B/6020/7470A and TE-LOP-557	During the Baseline Mustard TC campaign, one liquid sample analyzed for each TC stored at DCD, Area 10 prior to transfer to TOCDF	
2.2.1.3 Chemical Agent (Process Analysis)	LIC 1 LIC 2 MPF DFS	Agent % Purity HRA Metals % Organics Agent Organic Content Density	TE-LOP-584 TE-LOP-584, 3050B, 6010B/6020/7470A and TE-LOP-557 TE-LOP-572 TE-LOP-584 TE-LOP-584	During each agent campaign, one sample analyzed for each munitions/bulk item campaign or every three months, which ever is shorter	Tap or Remote Agent Sampling System if sample is collected from ACS-Tank-101 or 102 or Tap if collected from the Agent Quantification System or Pipette if agent sample is taken directly from munitions or bulk container
	ACS-TANK-101, 102	HRA Metals Agent Organic Content Density	TE-LOP-584, 3050B, 6010B/6020/7470A and TE-LOP-557 TE-LOP-584 TE-LOP-584	One representative sample from the ACS tank weekly of Baseline Mustard TC processing during the shakedown period.	Tap or Remote Agent Sampling System if sample is collected from ACS-Tank-101 or 102 or Tap if collected from the Agent Quantification System

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Density

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TE-LOP-584

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Tap if collected from the Agent Quantification System¶

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	Preparation and ANALYTICAL METHODS[1,5]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.4 Spent Decontamination Solution[5]	LIC 1 and LIC 2 Secondary Chamber	Agent Concentration % Organics Corrosivity (pH) Specific Gravity	TE-LOP-572 TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574	Each SDS-TANK prior to treatment	Tap
		Explosives HRA Metals TC Volatile Organics[8]	8330/8332 3050B, 6010B/7470A 1311, 8260B	Samples collected from the SDS tanks every three months as a confirmatory analysis	
Spent Decontamination Solution Additional Analysis (Organic Content[5] > 5%)		Ignitability HRA Metals TC Organics	1020A, 1010 3050B, 6010B/7470A 5030B, 8260B 3510C/3520C, 8270C	Each SDS-TANK having an organic content greater than 5% by weight	
2.2.1.5 Agent Collection System, Agent Quantification System and Spent Decontamination System Maintenance Residues[5]	MPF	Per requirements of 2.2.1.18.			
2.2.1.6. Noncombustible Bulk Solids	MPF	Generator knowledge and engineering evaluation	Wastes shall be weighed and thoroughly characterized prior to treatment in the MPF		
2.2.1.7 Drained Bulk Containers/Projectiles with Agent Residue	MPF	Non-embedded metals (Appendix B) and generator knowledge based on analytical results obtained from line item 2.2.1.3			
2.2.1.8 Energetic Munitions Components	DFS	Manufacturer Specifications (Appendix C)			

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	Preparation and ANALYTICAL METHODS[1,5]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.9 ECR Maintenance Residues (M55 Rocket Processing) See Table 2-2a for list of wastes ECR Maintenance Residues (Projectile Processing) See Table 2-2a for list of wastes	DFS	Generator knowledge based on analytical results obtained from line items 2.2.1.3 and 2.2.1.8.			
2.2.1.10 Spent Activated Carbon from MDB HVAC & ACS-TANK Filter Systems	Permitted storage until on-site treatment method is approved by the Executive Secretary				
2.2.1.11 Agent Contaminated Dunnage (TMA and UPA Generated)	Permitted storage until on-site treatment method is approved by the Executive Secretary			See Section 2.2.1.11	
2.2.1.12 Combustible Bulk Solids	MPF	Generator Knowledge and engineering evaluation when composition of waste prevents a representative sample from being taken. Treatment allowed based on worst case feed demonstrations performed during the MPF Secondary Waste Demonstration Test	Wastes shall be weighed and thoroughly characterized prior to treatment in the MPF		
2.2.1.13 PPE Respirator Canisters and ACAMS carbon canisters	MPF	Generator knowledge and engineering evaluation			
2.2.1.14 Spent Scrubber Brines	BRA	Agent Concentration Corrosivity (pH) Specific Gravity	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574	Each BRA-TANK prior to treatment in the BRA	Tap

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	Preparation and ANALYTICAL METHODS[1,5]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
		HRA Metals Total Organics[5]	3050B, 6010B/7470A 5030B, 8260B 3510C/3520C, 8270C	A sample collected and analyzed from each BRA Tank containing brine every month or each munition campaign change, whichever is sooner.	
2.2.1.15 Miscellaneous Agent Contaminated and Non-Agent Contaminated Liquid Wastes	LIC 1 and LIC 2 Primary Chamber	HRA Metals Review of manufacturer's information for all Properties) for organic constituents identified in Permit.	3050B, 6010B/7470A	Once for every batch[2]. Analysis to be completed prior to treatment.	Tap
2.2.1.16 Reserved					
2.2.1.18 Secondary Waste	MPF	HRA Metals, BTU s, Total Halogens, Ash Content Agent Concentration	3050B, 6010B/7470A ASTM D 5865 or generator knowledge 9057 or generator knowledge 5030B or generator knowledge TE-LOP-584, or generator knowledge	Each WIC fed with sludge	Thief, Scoop, Coliwasa
2.2.1.19 Agent Contaminated Sludge and Aqueous Waste	MPF	HRA Metals,	3050B, 6010B/7470A	Each WIC	Coliwasa or Pipette

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Deleted: TE-LOP-3010A, or 6010B/7470A, or 6020

Deleted: One sample for analysis of final rinse water from each bulk container processed by Special Handling System

Deleted: Remote Sampling System or Coliwasa

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	Preparation and ANALYTICAL METHODS[1,5]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]

Footnotes:
1. Analytical methods included those unique to TOCDF (designated as TE-LOP-XXX) and EPA SW-846 methods.
2. A batch is defined as all the drums (or containers) of waste generated from the same event, at the same location.
3. TCLP organics are defined as those compounds described by 40 CFR 261.24 by the waste codes D018, D019, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, and D042.
4. Dioxins (PCDDs) and Furans (PCDFs) are additionally analyzed for only if waste is Toxicity Characteristic for organics.
5. In addition, the Permittee shall sample the organic analytical parameters using the sampling and analytical methods in accordance with Section 2.10.
6. TCLP metals are defined as those described in 40 CFR 261.24 as waste codes D004, D005, D006, D007, D008, D009, D010 and D011.
7. HRA metals are defined as the following Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Silver, Selenium, Aluminum, Antimony, Beryllium, Boron, Cobalt, Copper, Manganese, Nickel, Thallium, Tin, Vanadium and Zinc.
8. Toxicity characteristic volatile organics include benzene, carbon tetrachloride, chlorobenzene, chloroform, methyl ethyl ketone, nitrobenzene, tetrachloroethylene, trichloroethylene, and vinyl chloride.

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL						
	WASTE STREAM	**GENERATION SOURCE**	**ANALYTICAL PARAMETERS**[5]	**ANALYTICAL METHODS**[5]	**FREQUENCY OF ANALYSIS**[5] **(establish profile)**	**SAMPLING METHOD**
2.2.2.2.	LIC Slag	LIC 1 LIC 2	TCLP Metals	1311, 6010B/7470A	After each rebricking, one sample composited from each container comprising a batch will be analyzed. If the metals concentration exceeds the metals regulatory limits each subsequent batch shall be analyzed for metals until the applicable waste codes no longer apply.	Hammer and Chisel or Coring Device
2.2.2.3	Treated M55 Rocket Parts/Ash or the Treated Residue Stream from the Simultaneous Processing of M55 Rocket Parts/Ash and GB Projectiles in the DFS	DFS HDC	Agent Concentration TCLP Metals TCLP Organics[3] PCB	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C5030B, 3510C/3520C 8082	Each month throughout M55 rocket campaign: One grab sample from each HDC waste bin generated in an operational 12 hr shift, composited into one sample for analysis	Thief, Scoop or Coring Device
			PCDD/PCDF[4] Explosive	8290 8330/8332	If the results indicate the waste is TC for organics, this waste stream shall be additionally analyzed for dioxins/ furans and explosives each month	
			Agent Concentration PCB	TE-LOP-572 8082	In the event waste is discharged from the HDC during upset, analyze one sample taken from each HDC waste bin generated during the upset	
2.2.2.4	Treated Burster & Fuse Bodies/Ash	DFS HDC	Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C5030B, 3510C/3520C	Each agent/munitions campaign or annually, whichever is shorter: One grab sample from each HDC waste bin generated in an operational 12 hr shift, composited into one sample for analysis	Thief, Scoop or Coring Device
2.2.2.5	Treated VX Mine/Fuse Bodies/Ash	DFS HDC	Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C,5030B, 3510C/3520C	Each month throughout each munitions campaign: One grab sample from each HDC waste bin generated in an operational 12 hr shift, composited into one sample for analysis	Thief, Scoop or Coring Device

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.5 Treated VX Mine/Fuse Bodies/Ash (continued)	DFS HDC	Agent Concentration	TE-LOP-572	In the event waste is discharged from the HDC during upset, analyze one sample taken from each HDC waste bin generated during the upset.	Thief, Scoop or Coring Device
2.2.2.6 DFS Cyclone Residues	DFS	Agent Concentration	TE-LOP-572	One core sample from each container generated	Scoop or Coring Device
		Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C	Every three months or each agent/munitions campaign whichever is shorter: One core sample from each container comprising a batch, composited into one sample for analysis.	
		PCDD/PCDF Explosives	8290 8330/8332	If analytical results demonstrate the waste to be TC for organics, waste stream shall be analyzed for dioxins/furans and explosives	
		PCB	8082	Additionally, during M55 rocket processing, samples shall be analyzed for PCBs, initially then every three months.	
2.2.2.7 Treated Bulk Containers/Projectiles/Mortor Rounds (Scrap Metal)	MPF	Chemical Agent Concentration	See Section 2.2.2.7	Each Burn Tray: Monitor a minimum of one cycle	ACAMS
2.2.2.8 MPF Treated Debris: Table 2-4 waste residues	MPF	Chemical Agent Concentration	See Section 2.2.2.8	Each Burn Tray: Monitor a minimum of one cycle	ACAMS
2.2.2.9 MPF Burn Tray,,WIC, and Cutaway Ton Container Residues	MPF	Agent Concentration TCLP Metals (see Table 2-4a) TCLP Organics[3] Total Volatile Organics (See Table 2-4b) Total Semi-Volatile Organics (See Table 2-4c) Dioxins/furans	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C 5035, 8260B 3540C, 8270C 8290	Each Shipping container (drum or roll-off) generated, a representative sample.	Thief, Scoop or Coring Device
2.2.2.10 MPF Munitions, Ton containers residues,	MPF	Agent Concentration HRA Metals TCLP Metals (see Table 2-4a) TCLP Organics[3] Total Volatile Organics (See Table 2-4b) Total Semi-Volatile Organics (See Table 2-4c)	TE-LOP-572 6010B/7470A 1311, 6010B/7470A 1311, 8260B/8270C 5035, 8260B 3540C, 8270C	Each Shipping container (drum or roll-off) generated a representative sample	Thief, Scoop or Coring Device

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Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.11 Incinerator Refractory	LIC 1 LIC 2 MPF DFS DUN	TCLP Metals	1311, 6010B/7470A	Each chamber change out: One grab sample from 10% of the containers comprising a batch, composited into one sample for analysis	Hammer and Chisel or Coring Device
2.2.2.12 PAS Residues	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS	Agent Concentration Corrosivity (pH)	TE-LOP-572 TE-LOP-574 (9040B)	Each container: One core sample for analysis	Trier or Coring Device
		Free Liquids TCLP Metals TCLP Organics[3] PCBs	TE-LOP-574 (9095) 1311, 6010B/7470A 1311, 8260B/8270C 8082	Initially for a new agent or munition campaign then every three months thereafter. During M55 Rockets agent/munitions campaign initially, then annually collected from first container generated	Trier or Coring Device
2.2.2.13 Scrubber Brines	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS BRA TANKS	Agent Concentration Corrosivity (pH) Specific Gravity	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574	Each BRA-TANK one sample for analysis prior to shipment, or each tanker if transferred directly from the PAS.	Tap, Coliwasa, or Bailer depending on sample location
		TC Metals TC Organics[3] PCB	1311, 6010B/7470A 1311, 8260B/8270C 8082	Each month or munition campaign change, whichever is sooner, one composite sample comprised of a sample from each BRA Tank. PCB analysis is required only if M55 rockets are processed.	Tap, Coliwasa, or Bailer, depending on sample location, while tank is being filled.

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.14. SDS-TANK Sludge	SDS-TANK	Agent Concentration Corrosivity (pH) Free Liquids Explosives TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095) 8330/8332 1311, 6010B/7470A 1311, 8260B/8270C	Each batch of sludge.	Tap, Coliwasa, or Bailer depending on sample location
		Agent Concentration Corrosivity (pH) Free Liquids	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095)	If the agent concentration is found to be greater than the WCL, decontamination solution will be added and another sample analyzed for agent, pH and free liquids..	
2.2.2.15. BRA-TANK Sludges	BRA-TANK	Agent Concentration Corrosivity (pH) Free Liquids TCLP Metals TCLP Organics[3] PCBs	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095) 1311, 6010B/7470A 1311, 8260B/8270C 8082	Each batch of sludge. During M55 Rocket agent /munitions campaign, annually collect a sample from the first container generated.	Trier or Coring Device
2.2.2.16. PAS Demister Candle Sleeves	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS	Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C	Each change out: Grab samples representative of the waste stream will be analyzed prior to shipment	Determined worse case section cut sleeve
		PCB	8082	During M55 Rocket agent /munitions campaign, annually collect a grab sample from 10% of the drums comprising each batch.	Determined worse case section cut sleeve
2.2.2.17. Scrubber Brine Salts	BRA-DDYR	Agent Concentration Corrosivity (pH) Free Liquids TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095) 1311, 6010B/7470A 1311, 8260B/8270C	Initially then every three months during processing One core sample from each BRA-DDYR salt bin generated in an 12 hr operational shift, composited into one sample for analysis	Trier or Coring Device
		PCB	8082	During M55 Rocket processing, scrubber brine salts shall be analyzed for PCBs.	

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.18. BRA PAS Knockout Box Residues	BRA-PAS	Agent Concentration Corrosivity (pH) Free Liquids TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095) 1311, 6010B/7470A 1311, 8260B/8270C	Initially, then every three months during processing. One core sample from theBRA-PAS Knockout Box salt bin for analysis	Trier or Coring Device
		PCB	8082	During M55 Rocket processing, residues shall also be analyzed for PCBs.	
2.2.2.19. BRA PAS Baghouse Residues	BRA-PAS	Agent Concentration Corrosivity (pH) Free Liquids TCLP Metals TCLP Organics[3] PCB	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP-574 (9095) 1311, 6010B/7470A 1311, 8260B/8270C 8082	Initially, then every three months during processing. One core sample from first four consecutively generated BRA-PAS Baghouse salt bins, composited into one sample for analysis. During M55 Rocket processing, residues shall be analyzed for PCBs.	Trier or Coring Device
2.2.2.20. Dunnage Generated in the Unpack Area	UPA	Chemical Agent TCLP Metals TCLP Organics	TE-LOP-572 1311, 6010B/7470A 3050A, 6010B/7471A 1311, 8260B/8270C,5030B, 3510C/3520C	One composite sample for analysis collected from a container on a quarterly basis (Every three months)	Wood plane to collect shavings from dunnage surface/ discolored or stained areas selected for sampling
2.2.2.21. DPE Suits	MDB	Agent Concentration (air)	ACAMS	Each bag of DPE suits, monitored for chemical agent. Suits with results below 0.2 VSL are sampled and analyzed for agent.	Piece cut from DPE suit front mid-section

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Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL					
		Agent Concentration (extraction)	TE-LOP-572	Samples of DPE suits passing the air monitoring shall be sampled and extracted/analyzed at a frequency of twenty percent of DPE suits or one sample per container, whichever is greater.	
2.2.2.22. Spent Non-Agent Contaminated Hydraulic Fluid and Lubricating Oil	MDB	Agent Concentration TCLP Organics[3] HRA metals	TE-LOP-572 1311, 8260B, 3580B, 8270C 6010B/7470A	Each batch: One sample each from 10% of the drums comprising a batch, composited into one sample for analysis	Coliwasa
2.2.2.23. Reserved					
2.2.2.24. CAL Aqueous Waste	CAL	Agent Concentration Corrosivity (pH) Ignitability TC Metals TC Organics[3]	TE-LOP-572 TE-LOP-574 (9040B) 1020 6010B/7470A 8260B, 8270C, 5030B, 3510C/3520C	Each container: One sample for analysis	Coliwasa
2.2.2.25. CAL Solid Wastes (debris)	CAL	Chemical Agent Concentration	TE-LOP-572	Each container: One sample of the decontamination solution collected at the bottom of the accumulation container taken for analysis	Coliwasa
2.2.2.26. MSB Solid Waste (debris)	MSB	Chemical Agent Concentration See section 2.2.2.25	TE-LOP-572	Each container: One sample of the decontamination solution collected at the bottom of the accumulation container taken for analysis	Coliwasa
2.2.2.27 Sump 110	Sump 110	Agent Concentration TCLP Metals TCLP Organics[3] pH	TE-LOP-572 1311, 6010B/7470A 1311, 8260B/8270C, 5030B, 3510C/3520C TE-LOP-574 (9040B)	Each tanker: One sample for analysis	Coliwasa

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.28. Spent Decontamination Solution	SDS	Agent Concentration HRA Metals Total Organics[3] pH Specific Gravity Total Halogens BTU Explosives Ignitability	TE-LOP-572 6010B//3010A7470A 8260B, 3510C, 8270C TE-LOP-574 (9040B) LOP 574 9056 ASTM D240-87 8330/8332 1010, 1020A	Each SDS Tank-101, 102 and 103	Tap
2.2.2.28.3. Spent Decontamination Solution	SDS	Agent Concentration pH Specific Gravity	TE-LOP-572 TE-LOP-574 (9040B) TE-LOP 574	Each 90-day SDS Tank	Tap

Footnotes:
1. The annotated methods identified are to be used. When new promulgated methods are approved by EPA, the Permittee shall notify the laboratory of the required change and request a time frame of when the change will occur. The laboratory will have six months to submit documentation to the Permittee of the change or a time frame when the change will be completed. The laboratory must use the most promulgated method within one year of promulgation. If that is not possible, a written request for extension must be provided to the Executive Secretary for approval.
2. A batch is defined as all the drums (or containers) of waste generated from the same event, at the same location.
3. TCLP organics are defined as those compounds described by 40 CFR 261.24 by the waste codes D018, D019, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, and D042.
4. Dioxins (PCDDs) and Furans (PCDFs) are additionally analyzed for only if waste isToxicity Characteristic for organics.
5. The Permittee shall sample the organic analytical parameters using the sampling and analytical methods and frequency of analysis in accordance with section 2.10.
6. TCLP metals are defined as those described in 40 CFR 261.24 as waste codes D004, D005, D006, D007, D008, D009, D010 and D011.
7. HRA metals are defined as the following Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Silver, Selenium, Aluminum, Antimony, Beryllium, Boron, Cobalt, Copper, Manganese, Nickel, Thallium, Tin, Vanadium and Zinc.

Table 2-2:
Site-Generated Waste Streams

Waste Stream	Description	EPA Waste Codes[1]	Utah Waste Code
MPF Metal	Metal parts after incineration.	N/A	F999
MPF Residue	MPF maintenance residue.	D006, D008	F999
LIC Slag (hazardous)	Slag generated in LIC secondary chamber.	D007	F999
LIC Refractory (hazardous)	Produced during refractory changeout.	D007	F999
DFS HDC Ash (hazardous)	Produced during the incineration of munitions.	D006, D008	F999
DFS Cyclone Residue	Produced during the incineration of munitions.	D006, D007, D008	F999
DFS Refractory	Produced during refractory changeout.	N/A	F999
Brine Salts (hazardous)	Produced during the drying of scrubber brine.	D006, D007, D008	F999
Brine Tank Sludge (hazardous)	Produced during the cleanout of tanks that store scrubber brine.	D006, D007, D008	F999
BRA Baghouse Residue (hazardous)	Residue collected from baghouse.	D006, D007, D008	F999
Waste Citric Acid	Generated during the cleaning of the brine reduction evaporators and PAS.	D006, D007	F999
Waste Hydrochloric Acid	Generated during the cleaning of the brine reduction evaporators and PAS.	D006, D007	F999
Demister Filters (hazardous)	Produced during the changeout of demister filters.	D006, D008	F999
PAS Quench Tower Residue	Produced during the cooling of the off-gas.	N/A	F999
PAS Sump Sludge (hazardous)	Generated during the cleanout of the PAS sumps.	D005, D006, D007, D008, D011	F999
RHA Baghouse Residue	Residue collected from baghouse.	D006, D008	F999
Decontamination- Neutralization Solutions	Produced from site decontamination and laboratory operations[2].	D002, D008, D018, D022, F002, F003, F005, D019, D022, D028	F999
Waste Heavy Metal Solution - Acidic, Oxidizing	Generated at the Laboratory.	D001, D002, D004, D006, D007, D008, D009, D010	F999
Waste Acid Solution	Generated at the Laboratory.	D002	F999
Waste Organic Solvents	Generated at the Laboratory.	D001, F002, F003, F005	F999
DPE Suits	Generated during toxic operations.	D003	F999/P999
Wood Pallets	Produced during the unpacking of ONCs and munitions.	N/A	F999/P999
Spent Activated Carbon	Produced during the changeout of carbon filters.	D003	F999, P999
Miscellaneous Metal Parts	Worn out equipment and parts.	D006, D008	F999
Clean-up Materials	Miscellaneous materials generated during the decontamination and maintenance of the plant.	N/A	F999
Incinerator Byproducts	Byproducts from maintenance activities.	D007	F999
Spent Hydraulic Fluid	Produced during maintenance activities.	N/A	F999
Waste Oil	Produced during maintenance activities.	F001, F002, D001	F999
Waste Paint Liquids	Produced during maintenance activities.	D001, D005, D007, D008, F002, F003, F005	F999
Waste Paint Solids	Produced during maintenance activities.	D007, D008, F002, F003, F005	F999
Spill Cleanup Materials	Generated during single substance spill response cleanup.	N/A	F999
Trash, Debris, & PPE	Produced during maintenance activities.	D003	P999/F999
BRA Baghouse Debris	Produced during maintenance activities	D007	P999/F999
Broken Fluorescent Lightbulbs	Produced during maintenance activities	D009	
CAL Lab Liquids	Miscellaneous materials generated after decontamination activities	D001, D002, D022	F999

Table 2-2:
Site-Generated Waste Streams

Waste Stream	Description	EPA Waste Codes[1]	Utah Waste Code
CAL Lab Solids	Miscellaneous materials generated after decontamination activities	F003, F005,	F999
Cardboard Rocket Ash	Generated during rocket processing		F999
DFS Demister Candle Packing	Produced during change out of demister candles		P999
Flammable Aerosols	Off-spec/expired shelf life material	D001, D007, D008, D035, D039	
Flammable Labpacks	Off-spec/expired shelf life material	D001	P999, F999
IPA/Glycol	Surrogate during systemization of plant equipment	D001	F999
Lab acids	Off-spec/expired shelf life material	D001, D002, D006, D008, D019, D022, F003	F999
Lab Solvents	Off-spec/expired shelf life material	D001, D002, F003, U080	F999
Lead Acid Batteries	Battery Change out	D002, D008	F999
Lithium Batteries	Battery Change out	D003	F999
M40 Cannisters	Generated during toxic operations		F999, P999
Monitoring Solids	Discarded monitoring and sampling equipment.		F999, P999
MPF Brick	MPF refractory replacement	D007	F999
MPF Vacuum Ash	Residue removed from MPF burn trays and munitions.	D006, D007, D008	F999
MSB Cleaning Solutions	Cleaning of sampling equipment		F999
NiCad Batteries	Battery Change out	D006,	F999
PAS Piping	PAS piping repairs and replacements		F999, P999
PAS Solids	Solids collected in PAS filters and removed from quench towers and scrubbers	D006, D007, D008	F999, P999
Sodium Lamps	Light Bulb replacement	D005, D008, D009	F999, P999
Spent IPA	Cleaning ACAMS equipment	D001	F999, P999
Spent Scrubber Brine	Generated from incineration operation	D004, D007, D008	F999, P999
Sump 110 Sludge	Sump 110 clean out		F999, P999
Tap Gear	Generated during toxic operations		F999, P999

Footnotes:
1. The waste codes are determined by analysis and/or generator knowledge. Additional waste codes may apply.
2. Waste Codes D019, D022, D028 are byproducts of VX decontamination with bleach.

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Table 2-3: Analytical Method Descriptions	
Method	**Description/Title**
SW-846 1010	Pensky – Martens Closed-Cup Method for Determining Ignitability
SW-846 1020A	Setaflash Closed-Cup Method for Determining Ignitability
SW-846 1311	Toxicity Characteristic Leaching Procedure.
SW-846 3010A	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy.
SW-846 3050B	Acid Digestion of Sediments, Sludges, and Soils.
SW-846 3510C	Separatory Funnel Liquid-Liquid Extraction.
SW-846 3520C	Continuous Liquid-Liquid Extraction.
SW-846 3541	Automated Soxhlet Extraction
SW-846 3540C	Soxhlet Extraction
SW-846 3580A	Waste Dilution.
SW-846 5030B	Purge and Trap
SW-846 5035	Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples
SW-846 6010B	Inductively Coupled Plasma - Atomic Emission Spectroscopy.
SW-846 6020	Inductively Coupled Plasma-Mass Spectrometry
SW-846 7470A	Mercury in Liquid Waste (Manual Cold-Vapor Technique).
SW-846 7471A	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
SW-846 8260B	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
SW-846 8270C	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
SW-846 8290	Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High Resolution Gas Chromato~~r~~graphy/High-Resolution Mass Spectrometry (HRGC/HRMS)
SW-846 8330	Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC)
SW-846 8332	Nitroglycerine by High Performance Liquid Chromatography
SW-846 9040B	pH Electrometric Measurement.
SW-846 9095A	Paint Filter Liquids Test
SW-846 8082	Polychlorinated Biphenyls (PCBs) by Capillary Column Gas Chromatography
EPA 160.1	Total Dissolved Solids (TDS)~~.~~
EPA 160.2	Total Suspended Solids (TSS)~~.~~
TE-LOP-557	Analysis of Metals by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
TE-LOP-572	Extractions/Analyses Including: WCL Extraction of GB for the Metals Diluent Solution; DWS Extraction of VX and HD; Extraction of GB, HD, and VX from Hydraulic Fluid; Analysis of GB, HD, and VX in Lubricating Oils; Analysis of GB, HD, and VX in Organic Wastes; and Extraction of GB, HD, and VX from Wood.
TE-LOP-574	Special Analyses Including: Specific Gravity Measurements.
TE-LOP-584	Neat Agent OPS/GC Including: GC-FID and GC-MSD Analyses of Agent Samples to Determine Agent Purity.

Table 2-4a
Metals (Universal Treatment Standards)

1	Antimony	1.15 mg/l TCLP	6	Chromium (Total)	0.6 mg/l TCLP	11	Silver	0.14 mg/l TCLP
2	Arsenic	5 mg/l TCLP	7	Lead	0.75 mg/l TCLP	12	Thallium	0.2 mg/l TCLP
3	Barium	21 mg/l TCLP	8	Mercury	0.025 mg/l TCLP	13	Vanadium	1.6 mg/l TCLP
4	Beryllium	1.22 mg/l TCLP	9	Nickel	11 mg/l TCLP	14	Zinc	4.3 mg/l TCLP
5	Cadmium	0.11 mg/l TCLP	10	Selenium	5.7 mg/l TCLP			

Table 2-4b
Volatile Organic Compounds Universal Treatment Standards

1	Acetone (160 mg/kg)	16	1,2-Dibromoethane (15mg/kg)	30	Methylene chloride (30mg/kg)
2	Benzene (10mg/kg)	17	Dibromomethane (15mg/kg)	31	Methyl isobutylketone (33 mg/kg)
3	Bromodichloromethane (15mg/kg)	18	Dichlorodifluoromethane (7.2mg/kg)	32	Methyl ethyl ketone (36 mg/kg)
4	Bromomethane (15mg/kg)	19	1,1-Dichloroethane (6mg/kg)	33	1,1,1,2-Tetrachloroethane (6mg/kg)
5	Carbon disulfide (4.8mg/l TCLP)	20	1,2-Dichloroethane (6mg/kg)	34	1,1,2,2-Tetrachloroethane (6mg/kg)
6	Carbon tetrachloride (6 mg/kg)	21	1,1-Dichloroethylene (6mg/kg)	35	Tetrachloroethylene (6 mg/kg)
7	Chlorobenzene (6mg/kg)	22	*trans*-1,2-Dichloroethylene (30mg/kg)	36	Toluene (10mg/kg)
8	2-Chloro-1,3-butadiene (0.28mg/kg)	23	1,2-Dichloropropane (18mg/kg)	37	Tribromomethane (Bromoform) (15mg/kg)
9	Chlorodibromomethane (15mg/kg)	24	*cis*-1,3-Dichloropropylene (18mg/kg)	38	1,1,1-Trichloroethane (6mg/kg)
10	Chloroethane (6mg/kg)	25	*trans*-1,3-Dichloropropylene (18mg/kg)	39	1,1,2-Trichloroethane (6mg/kg)
11	Chloroform (6mg/kg)	26	1,4-Dioxane (170mg/kg)	40	Trichloroethylene (6mg/kg)
12	2-Chloroethyl vinyl ether (NA)	27	Ethylbenzene (10mg/kg)	41	Trichlorofluoromethane (30mg/kg)
13	Chloromethane (30mg/kg)	28	Ethyl ether (160mg/kg)	42	1,1,2-Trichloro-1,2,2-trifluoroethane (30 mg/kg)
14	3-Chloropropylene (30mg/kg)	29	Iodomethane (65mg/kg)	43	Vinyl chloride (6 mg/kg)
15	1,2-Dibromo-3-chloropropane (15mg/kg)			44	Xylenes(o-, m-, p-) (30mg/kg)

Table 2-4c
Semi-Volatile Organic Compounds (Universal Treatment Standards)

1	Acenaphthylene (3.4mg/kg)	24	p-Cresol (5.6mg/kg)	49	Hexachloroethane (30mg/kg)
2	Acenaphthene (3.4mg/kg)	25	Dibenz(a,h)anthracene (8.2mg/kg)	50	Indeno(1,2,3-c,d) pyrene (3.4mg/kg)
3	Acetophenone (38mg/kg)	26	1,2-Dibromo-3-Chloropropane (15mg/kg)	51	Naphthalene (5.6mg/kg)
4	Aniline (14mg/kg)	27	Dibenz(a,e)pyrene (NA)	52	2-Naphthylamine (NA)
5	Anthracene (3.4mg/kg)	28	m-Dichlorobenzene (6mg/kg)	53	2-Nitroaniline (14mg/kg)
6	Benz(a)anthracene (3.4 mg/kg)	29	o-Dichlorobenzene (6mg/kg)	54	4-Nitroaniline (28mg/kg)
7	Benzal chloride (6mg/kg)	30	p-Dichlorobenzene (6mg/kg)	55	Nitrobenzene (14 mg/kg)
8	Benzo(b)fluoranthene (6.8mg/kg)	31	2,4-Dichlorophenol (14mg/kg)	56	2-Nitrophenol (13mg/kg)
9	Benzo(k)fluoranthene (6.8mg/kg)	32	2,6-Dichlorophenol (14mg/kg)	57	4-Nitrophenol (29mg/kg)
10	Benzo(g,h,i)perylene (1.8mg/kg)	33	Diethyl phthalate (28mg/kg)	58	PCBs, (total) (10mg/kg)
11	Benzo(a)pyrene (3.4mg/kg)	34	2,4-Dimethyl phenol (14mg/kg)	59	Pentachlorobenzene (10mg/kg)
12	4-Bromophenyl phenyl ether (15mg/kg)	35	Dimethyl phthalate (28mg/kg)	60	Pentachloroethane (6mg/kg)
13	Butyl benzyl phthalate (28mg/kg)	36	Di-n-butyl phthalate (28mg/kg)	61	Pentachloronitrobenzene (4.8 mg/kg)
14	p-Chloroaniline (16mg/kg)	37	1,4-Dinitrobenzene (2.3mg/kg)	62	Pentachlorophenol (7.4mg/kg)
15	*Bis*(2Chloroethoxy)methane (7.2mg.kg)	38	4,6-Dinitro-o-cresol (160mg/kg)	63	Phenanthrene (5.6mg/kg)
16	*Bis*(2-Chloroethyl)ether (6mg/kg)	39	2,4-Dinitrophenol (160mg/kg)	64	Phenol (6.2 mg/kg)
17	*Bis*(2-Chloroisopropyl) ether (7.2mg/kg)	40	2,4-Dinitrotoluene (140mg/kg)	65	Pyrene (8.2mg/kg)
18	4-Chloro-3-methylphenol (14mg/kg)	41	2,6- Dinitrotoluene (28mg/kg)	66	1,2,4,5-Tetrachlorobenzene (14mg/kg)
19	2-Chloronaphthalene (5.6mg/kg)	42	Di-n-octyl phthalate (28mg/kg)	67	2,3,4,6-Tetrachlorophenol (7.4 mg/kg)
20	2-Chlorophenol (5.7mg/kg)	43	Diphenylamine (13mg/kg)	68	1,2,4-Trichlorobenzene (19mg/kg)
21	Chrysene (3.4mg/kg)	44	Fluoranthene (3.4mg/kg)	69	2,4,5-Trichlorophenol (7.4mg/kg)
22	o-Cresol (5.6mg/kg)	45	Fluorene (3.4mg/kg)	70	2,4,6-Trichlorophenol (7.4mg/kg)
23	m-Cresol (5.6mg/kg)	46	Hexachlorobenzene (10mg/kg)	71	1,1,2-Trichloro-1,2,2-trifluoroethane (30mg/kg)
		47	Hexachlorobutadiene (5.6mg/kg)	72	1,2,3-Trichloropropane (30mg/kg)
		48	Hexachlorocyclopentadiene (2.4mg/kg)	73	PeCDD (All Pentachlorodibenzo-p-dioxins) 0.001mg/kg
74	PeCDFs (All				

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	Pentachlorodibenzofurans) 0.001 mg/kg				

Table 2-5 Agent Contaminated Waste That May Be Treated in The MPF	
Waste Stream and Quantity (if Applicable)	**Waste Code**(s)
Assorted Parts/Material Conveyors Chains, Rollers, Links Gears, Bearings, Bushings Wheels, Idlers Gearboxes Gasket Materials (non-combustible) Seals (non-combustible) Pre-filters and HEPA filters Carbon Adsorber Trays (from which carbon has been removed) Collets Drain Probes Crimp Jaws and Pins Bore Station Blades Turntable Projectile Bushings Projectile Pickup Heads Shear Blades Punches Pusher Assemblies Paper, Cloth, Pads, Pillows, Spill Adsorbents (Cellulose/polypropylene) (Maximum, 28 lbs/charge for a single charge at 20,000 BTU/lb at 1450° F) (Maximum 16 lbs/charge for consecutively charged trays containing paper, cloth, pads, pillows and spill absorbents, at 20,000 BTU/lb at 1450° F) Jaw Gripper Assemblies Projectile Cans Hoists	P999[1]
Electrical Components Motors Conduit (Metal) Solenoids Switches (Safety, Limit, Light) Light Fixtures, maximum of 20 units per furnace charge	P999[1]

<u>Plumbing Materials</u> Pumps Piping/Fittings/Tubing (metal) Chemical Seals Hydraulic Motors Hydraulic Cylinders Hydraulic Tubing/Fittings (metal) Hydraulic Hose/Fittings (metal) Pressure Regulators Flow Control Valves Pneumatic Actuators Accumulator Bladders Filter Cartridges/Elements and associated residue/cleanup material (includes AQS/ACS filter elements) Spray Nozzles Pipe Gaskets Valves (Hand, Solenoid, Agent, Decon, Hydraulic)	P999[1]
<u>Instrumentation</u> Test Equipment (Meters, Gauges, Etc.) Sensors, Transmitters, and Transducers Flow, Pressure, and Proximity Switches Pressure Gauges Cameras or Camera Parts Load Cells Speakers Low Volume Agent Samplers Thermocouples and Thermolwells	P999[1]

Assorted Solids Hand Tools Grating Metal Buckets, Pans, and Barrels Metal Brackets, Stands, Fixtures, Etc Escape Air Tank, Mask, and Regulators Scrub Brushes Banding Material Empty Overpacks/Drums (Non-Combustible) Mine Drum Monitoring Devices (MDMDs) Monitoring Sample Probes (DAAMS Tubes, etc.) Silicone material/parts Glassware Plaster Paint Brushes, Rollers, and Pans Empty Paint and Lubricant Spray Cans (Punched), maximum 25 units per furnace charge Personal Protective Equipment (non-combustible) DPE Leather Over Garments, maximum 10 units per furnace charge Plastic bags used to contain contaminated wastes, a maximum of 1.0 lb per furnace charge	P999[1]
[1] In addition to the P999 waste code, the above-mentioned waste streams may carry the following waste codes: F999, D002, D004, D005, D006, D007, D008, D009, D010, and D011.	

Table 2-A-1 CHEMICAL AGENT PHYSICAL PROPERTIES					
PROPERTY	**GB**	**VX**	**H**	**HD**	**HT**
Chemical Name	Isopropyl methyl-phosphonofluoridate (Sarin)	O-ethyl-S[2-(diisopropyl-amino)ethyl] methylphosphonothiolate	Same as HD with up to 25% impurities	Bis(2-chloroethyl) sulfide or 2,2'-dichlorodiethyl sulfide (sulfur mustard)	Same as HD with 40% T Bis[2(-chloroethylthio) ethyl] ether
Chemical formula	$C_4H_{10}FO_2P$	$C_{11}H_{26}NO_2PS$	$C_4H_8Cl_2S_{1.5}$	$C_4H_8Cl_2S$	$C_{5.15}H_{10.3}Cl_{2.0}O_{0.29}S_{1.29}$
Molecular weight	140.0951	267.37262	175.11016	159.07816	189.14764
Vapor specific gravity (air = 1.00)	4.86	9.2	5.4	5.4	6.92
Liquid density at 77° F[1] (lb/ft^3)	67.965	62.93	79.49	79.49	79.49
Freezing point (° F)	-69	Below -60	41 to 57	58	32 to 34.3
Boiling Point (°F)	316	572	437	423	442
Vapor pressure at 77°F[1] (mm Hg)	2.9	0.00063	0.059	0.11	0.104
Flash Point (° F)	Does not flash	318	212	221	212
Viscosity (centistokes) at 77° F [1]	1.28	9.96 (pure); may be substantially higher if partially decomposed	3.95	3.95	6.05
Color	Clear to straw to amber	Clear to straw	Amber-dark brown liquid		
Odor	None	None	Garlic		
Special properties	None		Permeates ordinary rubber		
Solubility properties	Miscible with water and readily soluble in all organic solvents	Best solvents are dilute mineral acids	Water (distilled), 0.092 g/100 cc at 72° F; completely soluble in acetone, CCl_4,CH_3Cl, tetrachloroethane, ethyl benzoate, ether)		
High heating value (Btu/lb at 60° F)	10073	15174	8100	8500	9,400
Physical state	Viscous liquid				

[1] Agents H and HT are at 68° F.

Table 2-A-2
CHEMICAL AGENT COMPOSITION

AGENT	CHEMICAL CONSTITUENT	Minimum Value (Wt%)	Maximum Value (Wt%)
GB	**Isopropyl methyl phosphonofluoridate (GB Agent)**	37	97
	N,N'-Diisopropylcarbodiimide (DICDI)	0	1.9
	Tributylamine (TBA)	1	9.5
	Methylphosphonofluoridic acid (MPA)[1]	0	8.35
	Diisopropyl methylphosphonate (DIMP)	0.9	27
	Methylphosphonofluoridic acid (MPFA) [1]	2.6	13.65
	Diispropyl urea (DIU)	0	2.4
	Diethyl methyl phosphonate (DEMP)	0.6	0.6
	Isopropylmethylphosphonic acid (IMPA) [1]	0.05	25.8
	Fluoride (F) [1]	0.1	2.8
	Density (g/ml)	1	1.2
	Metals	**Minimum (mg/kg)**	**Maximum (mg/kg)**
	Aluminum	4.7	3205
	Antimony	0.04	154
	Arsenic	0.72	556
	Barium	0.0094	40
	Beryllium	0.002	1
	Boron	1.1	4585
	Cadmium	0.011	7.9
	Chromium	0.72	54
	Cobalt	0.07	10.9
	Copper	0.25	120
	Iron	18	4855
	Lead	0.092	801
	Manganese	0.13	110
	Mercury	0.0061	9.1
	Nickel	0.72	415
	Selenium	<0.5	92
	Silver	0.004	13
	Thallium	<.14	154
	Tin	0.15	308
	Vanadium	0.33	10

Note:
1. The parameter is analyzed if the mass balance of the initial agent organic analysis is found to be 80% or less.

Table 2-A-2
CHEMICAL AGENT COMPOSITION

AGENT	CHEMICAL CONSTITUENT	Minimum Value (Wt%)	Maximum Value (Wt%)
VX[1]	**O-ethyl, S-[2-(diisopropylamino)ethyl] methylphosphonthiolate (VX Agent)**	59.6	96.7
	Ethyl methylphosphonic acid (EMPA)[2]	0.460	5.42
	N,N'-Dicyclohexylcarbodiimide (DCC or DCHCDI)	0.02	4.15
	bis(2-Diisopropylaminoethyl) disulfide (KM or EA 4196)[3]	0.60	2.3
	N,N'-Diisopropylcarbodiimide (DICDI)	ND	2.20
	S-(2-Diisopropylaminoethyl)methylphosponothioic acid (EA 2192)[3]	0.11	0.34
	bis(2-Diisopropylaminoethyl) sulfide (KK)	0.2	0.4
	Diethyl methylphosphonate (DEMP)	0.02	0.18
	Methylphosphonic acid (MPA)[2]	ND	ND
	Chlorine	0.306	0.514
	Metals	**Minimum (mg/kg)**	**Maximum (mg/kg)**
	Aluminum	1.5	1.8
	Antimony		ND
	Arsenic	ND	78
	Barium	ND	1.0
	Beryllium		ND
	Boron		ND
	Cadmium		ND
	Chromium	ND	12
	Cobalt		ND
	Copper	ND	6.7
	Iron	6.9	53
	Lead	ND	6.5
	Manganese		ND
	Mercury	ND	0.78
	Nickel		ND
	Selenium	ND	44
	Silver		ND
	Thallium		ND
	Tin		ND
	Vanadium	2.9	3.3
	Zinc	0.9	10.9

Notes:
1. Data are taken from the Bulk Agent Stockpile Survey Report and 2001 Agent VX Characterization.
2. The parameter is analyzed if the mass balance of the initial agent organic analysis is found to be less than 85%.
3. The parameter is analyzed during shakedown and trial burn sampling only.
ND = Not Detected

Deleted: **Table 2-A-2¶ CHEMICAL AGENT COMPOSITION**

Deleted: **AGENT** ... [3]

Deleted: **Bis (2-chloroethyl) sulfide (HD Agent)** ... [4]

Deleted: **HD**[2]

Deleted: 1,2-Bis(2-chloroethylthio)ethane ... [5]

Deleted: Bis[2-(2-chloroethylthio)ethyl]ether ... [6]

Deleted: 1,2,-Dichloroethane ... [7]

Deleted: 1-(2-Chloroethoxy)-2-(2-chloroethylthio)ethane ... [8]

Deleted: 2-Chloroethyl ?-chlorobutyl sulfide (mixed isomers) ... [9]

Deleted: 1,2-Dichloroethane[3] ... [10]

Deleted: Trichloroethylene[3] ... [11]

Deleted: Thiodiglycol[1,3] ... [12]

Deleted: Tetrachloroethylene[3] ... [13]

Deleted: 1,1,2,2-Tetrachloroet ... [14]

Deleted: Hexachloroethane[3] ... [15]

Deleted: **Metals** ... [16]

Deleted: Aluminum ... [17]

Deleted: Antimony ... [18]

Deleted: Arsenic ... [19]

Deleted: Barium ... [20]

Deleted: Beryllium ... [21]

Deleted: Boron ... [22]

Deleted: Cadmium ... [23]

Deleted: Chromium ... [24]

Deleted: Cobalt ... [25]

Deleted: Copper ... [26]

Deleted: Iron ... [27]

Deleted: Lead ... [28]

Deleted: Manganese ... [29]

Deleted: Mercury ... [30]

Deleted: Nickel ... [31]

Deleted: Selenium ... [32]

Deleted: Silver ... [33]

Deleted: Thallium ... [34]

Deleted: Tin ... [35]

Deleted: Vanadium ... [36]

Deleted: Zinc ... [37]

Deleted: Notes: ¶ ... [38]

Table 2-A-2
HD-Filled Ton Containers, Liquid Contents, Baseline
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HD	**Organic Compounds (Weight Percent)**			
	Bis (2-chloroethyl) sulfide (HD Agent)	89.31	101	78.7
	Thiodiglycol	0.026	0.029	0.0218
	1,2-Dichloroethane	0.606	0.993	0.197
	Tetrachloroethene	0.0502	0.0734	0.0127
	1,1,2,2-Tetrachloroethane	0.0518	0.0588	0.0472
	bis [2-(2-chloroethylthio)ethyl] ether (T)	0.169	0.355	0.0409
	1,2-*bis* (2-chloroethylthio) ethane (Q)	3.24	5.66	0.448
	Hexachloroethane	0.210	0.293	0.0245
	Lewisite[2] (mg/kg)	5.24	14.5	2.82
	1,4-Dithiane	1.10	5.6	0.028
	1,4-Thioxane	0.26	0.97	0.083
	2-Chloroethyl 4-chlorobutyl sulfide	0.51	3.0	0.079
	bis (2-Chloropropyl) sulfide	0.19	1.0	0.043
	Chlorine[3]	41.61	48.08	NA
	Metals (mg/kg)			
	Aluminum	38	55	12
	Antimony	5.09	5.5	0.67
	Arsenic	5.80	51.6	1.3
	Barium	5.08	5.5	0.44
	Beryllium	5.19	5.5	4.8
	Boron	9.34	11	4.0
	Cadmium	5.19	5.5	4.8
	Chromium	4.81	29.9	1.4
	Cobalt	1.03	1.1	0.33
	Copper	37.9	84.8	4.5
	Lead	4.71	5.5	0.47
	Manganese	1.67	6.49	0.33
	Mercury	0.35	0.55	0.054
	Nickel	3.40	15.7	0.36
	Selenium	10.1	11	1.2
	Silver	5.15	5.5	1.72
	Thallium	5.19	5.5	4.8
	Tin	10.4	11	9.54
	Vanadium	3.12	5.5	1.06
	Zinc	9.76	29.4	3.42

Notes:

1. The average, minimum and maximum concentration values shown in this table are based upon the results of the Mustard Sample Validation Project for the 80 of 98 ton containers sampled that contained less than one ppm Hg in their liquid contents. Data from the 18 of 98 ton containers that had elevated mercury concentrations are not included in these values.
2. The values for Lewisite are reported in mg/kg instead of “weight percent”.
3. The values for chlorine were calculated as the total combined weight of chlorine in all of the chlorine-bearing organic compounds.

Table 2-A-2
Baseline HD-Filled Ton Containers, Solid Contents
CHEMICAL AGENT COMPOSITION[1]

Deleted: , Baseline

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HD	Metals (mg/kg)			
	Aluminum	36.2	160	10.8
	Antimony	2.05	30.3	0.179
	Arsenic	176	1850	0.935
	Barium	1.42	14.2	0.0467
	Beryllium	4.9	5.57	0.0572
	Boron	9.7	11.1	3.99
	Cadmium	0.888	5.34	0.0492
	Chromium	47.7	397	9.28
	Cobalt	7.63	27.1	2.00
	Copper	151	2350	4.13
	Lead	65.1	625	6.61
	Manganese	411	1960	47
	Mercury	1.59	25.6	0.0807
	Nickel	82.6	965	8.99
	Selenium	24.7	27.8	1.09
	Silver	4.41	5.55	0.0622
	Thallium	5.04	5.57	0.412
	Tin	9.39	52.6	0.966
	Vanadium	3.55	5.57	0.98
	Zinc	224	4950	2.62

Notes:

1. The average, minimum and maximum concentration values shown in this table are based upon the results of the Mustard Sample Validation Project for the 80 of 98 ton containers sampled that contained less than one ppm Hg in their liquid contents. Data from the 18 of 98 ton containers that had elevated mercury concentrations are not included in these values.

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Deleted: **Table 2-A-2-a[1]**
VX HYDROLYSATE COMPOSITION[3]

Deleted: **CHEMICAL CONSTITUENT** ... [39]

Deleted: **VX Neutralent**

Deleted: **O-ethyl, S-[2-(diisopropylamino)ethyl] methylphosphonthiolate (VX Agent)**

Deleted: <20 (µg/L)¶ ... [40]

Deleted: S-(2- ... [41]

Deleted: Carbon Disulfide ... [42]

Deleted: Acetone[2] ... [43]

Deleted: 2-Butanone[2] ... [44]

Deleted: Acetaldehyde ... [45]

Deleted: Acetic Acid, Methyl e ... [46]

Deleted: Diethyl Disulfide ... [47]

Deleted: Triirane ... [48]

Deleted: Ethane, 1,1-Dimethox ... [49]

Deleted: Dethyl ... [50]

Deleted: Triethylphosphorothi ... [51]

Deleted: 2-(diisopropylamino) ... [52]

Deleted: bis (2-Diisopropylam ... [53]

Deleted: bis(2-Diisopropylami ... [54]

Deleted: n-Nitrosodiphenylami ... [55]

Deleted: Urea, N,N'-bis(1-met ... [56]

Deleted: Diisopropylamine ... [57]

Deleted: Unknown thiol comp ... [58]

Deleted: Methylphosphonic ac ... [59]

Deleted: Ethyl methylphospho ... [60]

Deleted: **Metals** ... [61]

Deleted: Antimony ... [62]

Deleted: Arsenic ... [63]

Deleted: Cadmium ... [64]

Deleted: Chromium ... [65]

Deleted: Lead ... [66]

Deleted: Manganese ... [67]

Deleted: Mercury ... [68]

Deleted: Nickel ... [69]

Deleted: Selenium ... [70]

Deleted: Thallium ... [71]

Deleted: **Minimum Value¶** ... [72]

Deleted: **Heat Content** ... [73]

Deleted: Notes: ¶ ... [74]

Deleted: **TABLE 2-B-1**¶
Metals in Munitions (Metals with Feed Rate Limitations - Module V)

Deleted: **Metals (lb)** ... [75]

Deleted: **4.2" Cartridge (M2), Agent HT, Surface Area = 1.88 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [76]

Deleted: Metals in Energetic ... [77]

Deleted: Metals in Paint ... [78]

Deleted: **TOTAL (lb, non-em** ... [79]

Deleted: **4.2" Cartridge (M2A1), Agent HD, Surface Area = 1.88 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [80]

Deleted: Metals in Energetic ... [81]

Deleted: Metals in Paint ... [82]

Deleted: **TOTAL (lb, non-em** ... [83]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
<#>No distinction between different chromium valences (e.g., identification of hexavalent chrome) can be made from the available information.¶
<#>NR-Not reported, no data provided.¶

Metals (lb)	Sb	As	Ba	Be			Pb	Hg	Ag	Tl

2.

Deleted: **TABLE 2-B-1¶ Metals in Munitions (Metals with Feed Rate Limitations - Module V)**

Deleted: **Cd** ... [84]

Deleted: **155 MM Projectile (M104 and M110), Agent H, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [85]

Deleted: Metals in Energetic (l ... [86]

Deleted: Metals in Paint ... [87]

Deleted: **TOTAL (lb, non-em** ... [88]

Deleted: **155 MM Projectile (M121/A1 And M122), Agent GB, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [89]

Deleted: Metals in Energetic ... [90]

Deleted: Metals in Paint ... [91]

Deleted: **TOTAL (lb, non-em** ... [92]

Deleted: **155 MM Projectile (M121/A1), Agent VX, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [93]

Deleted: Metals in Energetic ... [94]

Deleted: Metals in Paint ... [95]

Deleted: **TOTAL (lb, non-em** ... [96]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
<#>No distinction between different chromium valences (e.g., identification of hexavalent chrome) can be made from the available information.¶ ... [97]

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TABLE 2-B-1
Metals in Munitions[1] (Metals with Feed Rate Limitations - Module V)

Metals[2]	Sb	As	Ba	Be	Cd	Cr[3]	Pb	Hg	Ag	Tl
Baseline Ton Containers, Agent HD										
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	0.00862	0.04108	0.64627	0.00929	0.33732	0.20048	2.85397	0.00086	0.00913	0.00932
Metals in Fusible Plugs	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Paint[5]	NR	NR	0.63778	NR	0.32875	0.18410	2.83462	NR	NR	NR
Metals in Liquid Agent[6]	0.00825	0.00940	0.00823	0.00841	0.00841	0.00779	0.00763	0.00057	0.00834	0.00841
Metals in Solid Agent Residue[6]	0.00037	0.03168	0.00026	0.00088	0.00016	0.00859	0.01172	0.00029	0.00079	0.00091

Notes:
1 The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.
2 NR – not reported, no information provided.
3 No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.
4 The weight and composition of brass valves associated with ton containers are unknown. Therefore the brass-constituent metals not included in the shown value for embedded metals of a ton container. On Mustard TCs, the fusible plug port has been fitted with a non-fusible solid brass plug in place of the original lead-containing fusible plugs.
5 The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: Ton Container 65.75 ft^2.
6 Based on a ton container filled with 1800 pounds HD, 10% solidified, liquid and solids containing the average metals concentration from 80 samples analyzed from ton containers having a liquid mercury concentration less than one ppm. Metals Concentrations are tabulated in Table 2-A-2.

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Metals (lb)	Sb	As	Ba	Be	Cd				Ag	Tl

Deleted: **TABLE 2-B-1¶ Metals in Munitions (Metals with Feed Rate Limitations - Module V)**

Deleted: **Cr** ... [98]

Deleted: **Ton Containers, Agent HD, Surface Area = 65.75 sq. ft.**

Deleted: Metals in Fusible Plu ... [99]

Deleted: Metals in Paint ... [100]

Deleted: **TOTAL (lb, non-e** ... [101]

Deleted: **Ton Containers, Agent GB, Surface Area = 65.75 sq. ft.**

Deleted: Metals in Fusible Pl ... [102]

Deleted: Metals in Paint ... [103]

Deleted: **TOTAL (lb, non-e** ... [104]

Deleted: **Ton Containers, Agent VX, Surface Area = 65.75 sq. ft.**

Deleted: Metals in Fusible Pl ... [105]

1.										

Deleted: Metals in Paint
Deleted: NR
Deleted: NR
Deleted: 0.63778
Deleted: NR
Deleted: 0.32875
Deleted: 0.1841
Deleted: 1.15062
Deleted: NR
Deleted: NR
Deleted: NR
Deleted: **TOTAL (lb, non-embedded)**
Deleted: NR
Deleted: NR
Deleted: **0.63778**
Deleted: NR
Deleted: **0.32875**
Deleted: **0.1841**
Deleted: **2.83462**
Deleted: NR
Deleted: NR
Deleted: NR
Deleted: <#>The ton containers are constructed of carbon steel. Any metals associated with the steel are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
<#>The fusible plugs associated with the ton containers melt at 108 °C. Therefore the associated metals are assumed to be non-embedded and are included in the above totals. ¶
<#>No distinction between diff ... [106]
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										Tl
										NR
										NR
										NR
										NR
										NR
										NR
TOTAL (lb, non-embedded)										NR
1.										

Deleted: **TABLE 2-B-1¶ Metals in Munitions (Metals with Feed Rate Limitations - Module V)**

Deleted: **Metals (lb)** ... [107]

Deleted: **105 MM Cartridge (M360), Agent GB, Surface Area = 2.8 sq. ft.**

Deleted: Metals in Munition Metal including fuze (embedded) ... [108]

Deleted: Metals in Energetic ... [109]

Deleted: Metals in Paint ... [110]

Deleted: **TOTAL (lb, non-e** ... [111]

Deleted: **105 MM Projectile (M360), Agent GB, Surface Area = 2.8 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [112]

Deleted: Metals in Paint ... [113]

Deleted: NR ... [114]

Deleted: <#>The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
<#>No distinction between different chromium valences (e.g., identification of hexavalent chrome) can be made from the available information.¶
<#>The primer, propelling charge, and cartridge case associated with the 105 MM Cartridge are not processed at the TOCDF and are therefore not included in the above totals.¶
NR-not reported, not information provided.

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Deleted: **TABLE 2-B-1¶**
Metals in Munitions (Metals with Feed Rate Limitations - Module V)

Deleted: **Metals (lb)** ... [115]

Deleted: **115 MM Rocket (M55), Agent GB, Surface Area = 7.93 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [116]

Deleted: Metals in Energetic ... [117]

Deleted: Metals in Paint ... [118]

Deleted: **TOTAL (lb, non-e** ... [119]

Deleted: **NR**

Deleted: **115 MM Rocket Warhead (M56), Agent GB, Surface Area = 2.6 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [120]

Deleted: Metals in Energetic ... [121]

Deleted: Metals in Paint ... [122]

Deleted: **TOTAL (lb, non-e** ... [123]

Deleted: **NR**

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. One third of the M55 Rocket surface area is assumed to be associated with the warhead for the calculation of the warhead surface area.¶
3. No distinction between different chromium valences (e.g., identification of hexavalent chrome) can be made from the available information.¶
4. The rocket warhead is constructed of an aluminum casing (95% Al, 5% Cu). The casing is assumed to weigh 10.8 lbs for the above calculations.¶
5. NR-not reported, no information provided.

Deleted: **TABLE 2-B-1¶
Metals in Munitions (Metals with Feed Rate Limitations - Module V)**

Deleted: **Metals (lb)** ... [124]

Deleted: **115 MM Rocket (M55), Agent VX, Surface Area = 7.93 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [125]

Deleted: Metals in Energetic ... [126]

Deleted: Metals in Paint ... [127]

Deleted: **TOTAL (lb, non-e** ... [128]

Deleted: **115 MM Rocket Warhead (M56), Agent VX, Surface Area = 2.6 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [129]

Deleted: Metals in Energetic ... [130]

Deleted: Metals in Paint ... [131]

Deleted: **TOTAL (lb, non-e** ... [132]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. One third of the M55 Rocket surface area is assumed to be associated with the warhead for the calculation of the warhead surface area.¶
3. No distinction between different chromium valences (e.g., identi ... [133]

Deleted: **TABLE 2-B-1¶** ... [134]

Deleted: **Metals (lb)** ... [135]

Deleted: Weteye Bomb (MK- ... [136]

Deleted: Metals in Paint ... [137]

Deleted: **TOTAL (lb, non-e** ... [138]

Deleted:

Deleted: 1. The metals with ... [139]

Deleted: **TABLE 2-B-1¶**
Metals in Munitions (Metals with Feed Rate Limitations - Module V)

Deleted: **Metals (lb)** ... [140]

Deleted: **Mine (M23), Agent VX, Surface Area = 3.5 sq. ft.**

Deleted: Metals in Energetic ... [141]

Deleted: Metals in Paint ... [142]

Deleted: **TOTAL (lb, non-e** ... [143]

Deleted: **Spray Tank (TMU-28), Agent VX, Surface Area = 91.1 sq. ft.**

Deleted: Metals in Paint ... [144]

Deleted: Metals in Nose cone (embedded) ... [145]

Deleted: Metals in Nose cone (non-embedded) ... [146]

Deleted: **TOTAL (lb, non-e** ... [147]

Deleted: 1. The metals within the minemetal are unknown, not estimated, and considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. No distinction between different chromium valences (e.g., identification of hexavalent chrome) can be made from the available information.¶
3. NR-not reported, no information provided.¶

Deleted: **TABLE 2-B-2¶ Metals in Munitions (Other Metals of Interest)**

Deleted: **Metals (lb)** ... [148]

Deleted: **4.2" Cartridge (M2), Agent HT, Surface Area = 1.88 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [149]

Deleted: Metals in Energetic ... [150]

Deleted: Metals in Paint ... [151]

Deleted: **TOTAL (lb, non-e** ... [152]

Deleted: **4.2" Cartridge (M2A1), Agent HD, Surface Area = 1.88 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [153]

Deleted: Metals in Energetic ... [154]

Deleted: Metals in Paint ... [155]

Deleted: **TOTAL (lb, non-e** ... [156]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. NR-not reported, no information provided.

Deleted: **TABLE 2-B-2¶
Metals in Munitions (Other Metals of Interest)**

Deleted: **Metals (lb)** ... [157]

Deleted: **155 MM Projectile (M104 and M110), Agent H, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [158]

Deleted: Metals in Energetic ... [159]

Deleted: Metals in Paint ... [160]

Deleted: **TOTAL (lb, non-e** ... [161]

Deleted: **155 MM Projectile (M121/A1 And M122), Agent GB, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [162]

Deleted: Metals in Energetic ... [163]

Deleted: Metals in Paint ... [164]

Deleted: **TOTAL (lb, non-e** ... [165]

Deleted: **155 MM Projectile (M121/A1), Agent VX, Surface Area = 2.9 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [166]

Deleted: Metals in Energetic ... [167]

Deleted: Metals in Paint ... [168]

Deleted: **TOTAL (lb, non-e** ... [169]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. NR-not reported, no information provided.

Deleted: **TABLE 2-B-2¶**
Metals in Munitions (Other Metals of Interest)

Deleted: **Metals (lb)** ... [170]

Deleted: Ton Containers, Agent HD, Surface Area = 65.75 sq. ft.

Deleted: Metals in Fusible Pl ... [171]

Deleted: Metals in Paint ... [172]

Deleted: **TOTAL (lb, non-e** ... [173]

Deleted: Ton Containers, Agent GB, Surface Area = 65.75 sq. ft.

Deleted: Metals in Fusible Pl ... [174]

Deleted: Metals in Paint ... [175]

Deleted: **TOTAL (lb, non-e** ... [176]

Deleted: Ton Containers, Agent VX, Surface Area = 65.75 sq. ft.

Deleted: Metals in Fusible Pl ... [177]

Deleted: Metals in Paint ... [178]

Deleted: **TOTAL (lb, non-er** ... [179]

Deleted: <#>The ton containers are constructed of carbon steel. Any metals associated with the steel are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
<#>The fusible plugs associated with the ton containers melt at 108 ^{o}C. Therefore the associated metals are assumed to be non-embedded and are included in the above totals. ¶
<#>Weight and composition of brass valve associated with ton containers is unknown and therefore is not included in the above values (embedded and would not affect totals).¶
<#>NR-not reported, no information provided.¶
<#>VX Test Cylinders are assumed to have the same metals loading as VX ton containers for Table 2-B-2.¶

Deleted: **TABLE 2-B-2¶
Metals in Munitions (Other Metals of Interest)**

Deleted: **Metals (lb)** ... [180]

Deleted: **105 MM Cartridge (M360), Agent GB, Surface Area = 2.8 sq. ft.**

Deleted: Metals in Munition Metal including fuze (embedded) ... [181]

Deleted: Metals in Energetic ... [182]

Deleted: Metals in Paint ... [183]

Deleted: **TOTAL (lb, non-e** ... [184]

Deleted: **105 MM Projectile (M360), Agent GB, Surface Area = 2.8 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [185]

Deleted: Metals in Paint ... [186]

Deleted: **TOTAL (lb, non-e** ... [187]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. The primer, propelling charge, and cartridge case associated with the 105 MM Cartridge are not processed at the TOCDF and are therefore not included in the above totals.¶
3. NR-not reported, no information provided.

**Deleted: TABLE 2-B-2¶
Metals in Munitions (Other Metals of Interest)**

Deleted: Metals (lb) ... [188]

Deleted: 115 MM Rocket (M55), Agent GB, Surface Area = 7.93 sq. ft.

Deleted: Metals in Munition Metal (embedded) ... [189]

Deleted: Metals in Energetic ... [190]

Deleted: Metals in Paint ... [191]

Deleted: TOTAL (lb, non-e ... [192]

Deleted: 115 MM Rocket Warhead (M56), Agent GB, Surface Area = 2.6 sq. ft.

Deleted: Metals in Munition Metal (embedded) ... [193]

Deleted: Metals in Energetic ... [194]

Deleted: Metals in Paint ... [195]

Deleted: TOTAL (lb, non-e ... [196]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. One third of the M55 Rocket surface area is assumed to be associated with the warhead for the calculation of the warhead surface area.¶
3. The rocket warhead is constructed of an aluminum casing (95% Al, 5% Cu). The casing is assumed to weigh 10.8 lbs for the above calculations.¶
4. NR-not reported, no information provided.

Deleted: **TABLE 2-B-2¶**
Metals in Munitions (Other Metals of Interest)

Deleted: **Metals (lb)** ... [197]

Deleted: **115 MM Rocket (M55), Agent VX, Surface Area = 7.93 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [198]

Deleted: Metals in Energetic ... [199]

Deleted: Metals in Paint ... [200]

Deleted: **TOTAL (lb, non-e** ... [201]

Deleted: **115 MM Rocket Warhead (M56), Agent VX, Surface Area = 2.6 sq. ft.**

Deleted: Metals in Munition Metal (embedded) ... [202]

Deleted: Metals in Energetic ... [203]

Deleted: Metals in Paint ... [204]

Deleted: **TOTAL (lb, non-e** ... [205]

Deleted: 1. The metals within the munitions metal are considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶
2. One third of the M55 Rocket surface area is assumed to be associated with the warhead for the calculation of the warhead surface area.¶
3. The rocket warhead is constructed of an aluminum casing (95% Al, 5% Cu). The casing is assumed to weigh 10.8 lbs for the above calculations.¶ ... [206]

Deleted: **TABLE 2-B-2¶** ... [207]

Deleted: **Metals (lb)** ... [208]

Deleted: Weteye Bomb (MK- ... [209]

Deleted: Metals in Paint ... [210]

Deleted: **TOTAL (lb, non-e** ... [211]

Deleted: 1. The metals with ... [212]

TABLE 2-B-2 Metals in Munitions[1] (Other Metals of Interest)										
Metals[2]	**Se**	**Ni**	**V**	**Al**	**B**	**Co**	**Cu**	**Mn**	**Sn**	**Zn**
Baseline Ton Containers, Agent HD										
TOTAL EMBEDDED METALS[1,3] (pounds)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[3] (pounds)	0.02081	0.34913	0.00569	0.06809	0.01688	0.00304	0.08858	0.07670	0.01854	0.05613
Metals in Fusible Plugs	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Paint[4]	NR	0.32875	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Liquid Agent[5]	0.01636	0.00551	0.00505	0.06157	0.01513	0.00167	0.06140	0.00271	0.01685	0.01581
Metals in Solid Agent Residue[5]	0.00445	0.01487	0.00064	0.00652	0.00175	0.00137	0.02718	0.07399	0.00169	0.04032

Notes:

1 The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. These values are not included in the Non-Embedded Metals totals.

2 NR – not reported, no information provided.

3 The weight and composition of brass valves associated with ton containers are unknown. Therefore the brass-constituent metals are not included in the shown value for embedded metals of a ton container. On Mustard TCs, the fusible plug port has been fitted with a non-fusible solid brass plug in place of the original lead-containing fusible plugs.

4 The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface area: Ton Container 65.75 ft^2.

5 Based on a ton container filled with 1800 pounds HD, 10% solidified, liquid and solids containing the average metals concentration from 80 samples analyzed from ton containers having a liquid mercury concentration less than one ppm. Metals concentrations are tabulated in Table 2-A-2.

Deleted: TABLE 2-B-2¶ Metals in Munitions (Other Metals of Interest)

Deleted: Metals (lb) ... [213]

Deleted: Mine (M23), Agent VX, Surface Area = 3.5 sq. ft.

Deleted: Metals in Energetic ... [214]

Deleted: Metals in Paint ... [215]

Deleted: TOTAL (lb, non-e ... [216]

Deleted: Spray Tank (TMU-28), Agent VX, Surface Area = 91.1 sq. ft.

Deleted: Metals in Agent ... [217]

Deleted: Metals in Paint ... [218]

Deleted: Metals in Nose Cone (embedded) ... [219]

Deleted: Metals In Nose Cone (non-embedded) ... [220]

Deleted: TOTAL (lb, non-er ... [221]

Deleted: 1. The metals within the mine metal are unknown, not estimated, and considered to be fixed (embedded, inert) and will not vaporize and are therefore not included in the above totals.¶ 2. NR-not reported, no information provided.

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Table 2-C-1
ENERGETIC/AGENT NOMINAL WEIGHT
FOR
CHEMICAL AGENT MUNITIONS/BULK CONTAINERS

		DIMENSIONS			AGENT		BURSTER			PROPELLANT			OTHER
MUNITION	MODEL / AGENT	DIAMETER	LENGTH (INCHES)	WEIGHT (LBS)	TYPE	WEIGHT (LBS)	MODEL	EXPLOSIVE	WEIGHT (LBS)	MODEL	WEIGHT (LBS)	FUSE MODEL	ENERGETIC COMPONENTS
105-mm Cartridge	M360	105 mm	31.1	43.86	GB	1.63	M40A	Comp B	1.12	-	-	M508A1	M28B2 Primer
							NA	NA	NA			M557	NA
105-mm Projectile	M360	105 mm	31.1	NA	GB	1.63	--	--	--	--	--	--	--
4.2-inch Mortar	M2	4.2 inch	21.0	24.67	HD	6.0	M14	Tetryl	0.14	-	-	M8	M2 Primer
				24.47	HT	5.8							
155-mm Projectile	M104	155 mm	26.8	98.9	H	11.7	M6	Tetrytol	0.83	--	--	--	0.3 lbs TNT supplemental charge
	M110												
	M121				GB	6.5	--	--	--				
	M121A1				VX	6.3	M71	Comp B	2.45				
					GB	6.5							
	M122				GB	6.5	M37	Tetrytol					
Land Mine	M23	13.5	5	23	VX	10.5	M38	Comp B	0.8	--	--	M603	M120 Booster, M48 initiator, M1 activator
Rocket	M55	115 mm	78.0	57	GB	10.7	M34	Comp B	3.2	M28	19.3	M417	M62 Primer
							M36						
					VX	10.0	M34			M67			
							M36						
525 lb Weteye Bomb	MK-116-0	14	84	525	GB	347	--	--	--	--	--	--	--
Spray Tank	TMU-28/B	22.5	185.5	1,935	VX	1,356	--	--	--	--	--	--	--
Ton Containers	Agent GB	30.1	85.1	2,900	GB	1,500	--	--	--	--	--	--	--
	Agent HD			3,400	HD	1,800							
	Agent VX			3,100	VX	1,500							

NOTES:
NA = Information not available;
HD, and HT = Mustard
RDX = cyclotrimethylenetrinitramine; $N(NO_2)CH_2N(NO_2)CH_2N(NO)_2CH_2$
Comp B (Composition B) = 60% RDX, 39.5% TNT, 0.5% calcium silicate
TNT = 2,4,6-trinitrotoluene; $CH_3C_6H_2(NO_2)_3$
Tetryl = 2,4,6-trinitrophenylmethylnitramine; $(NO_2)_3C_6H_2N(NO_2)CH_3$
Tetrytol = 70% Tetryl, 30% TNT

Table 2-C-2
COMPOSITION OF REACTIVE MATERIAL IN MUNITIONS

MUNITION	COMPONENT			WEIGHT	COMPOSITION
M55 Rocket	1.	Fuze, M417			
		a.	Booster	1.12 grains	RDX[a]
		b.	Pellet Booster	183.5 grains	RDX[a]
		c.	Rotor, Lead	2.77 grains	RDX[a]
	2.	Detonator, M63			
		a.	Upper Charge Primer Mix	0.31 grains	Overall Mixture: 40% Lead Styphnate, 20% Lead Azide, 20% Barium Nitrate, 15% Antimony Sulfide, 5% Tetracene
		b.	Intermediate Charge	2.0 grains	Lead Azide
		c.	Lower Charge	0.99 grains	RDX[a]
	3.	Squib, M2			
		a.	Flash Charge	1.0 grains each(2 required)	Overall Mixture: 32% Lead Thiocyanate, 40% Potassium Chlorate, 18% Charcoal 10% Egyptian Lacquer
		b.	Booster Igniter	46.2 grains(2 required)	Overall Mixture: 49% Magnesium, 49% Potassium Perchlorate, 2% Cellulose Nitrate-Camphor
	4.	Igniter Rocket Motor, M62		385 grains	Overall Mixture: 49% Magnesium, 49% Potassium Perchlorate, 2% Cellulose Nitrate-Camphor
	5.	Propellant Grain, M28		134,750 grains	Overall Mixture:60.0% Nitrocellulose, 23.8% Nitroglycerin, 9.9% Triacetin, 2.6% Diethylphthalate, 2.0% Lead Stearate, 1.7% 2-Nitrodiphenylamine
	6.	Rocket Burster, M34		17,500 grains	Composition B[b]
	7.	Rocket Burster, M36		4,900 grains	Composition B[b]
	8.	Rocket Motor Pellet		3.1 grains	Overall Mixture:49% Magnesium, 49% Potassium Perchlorate, 2% Cellulose Nitrate-Camphor
M23 Land Mine	1.	Fuze, M603			
		a.	Detonator, M45		
			(1)	1.4 grains	Overall Mixture: 53% Potassium Chlorate, 25% Lead Thiocyanate, 17% Antimony Sulfide, 5% Lead Azide
			(2)	3.9 grains	Lead Azide
			(3)	1.9 grains	RDX[a]
	2.	Booster, M120		169.8 grains	RDX[a]
	3.	Burster, M38		5710 grains	Composition B[b]
				47 grains	Tetryl
	4.	Initiator, M48		848.8 grains	Composition B[b]
	5.	Activator, M1		46.3 grains	8% Lead Azide, 87% Tetryl, 5% Igniter Mix
M360	1.	Fuze, M508			
		a.	Detonator (M18)	230 mg	Lead Azide
				340 mg	Tetryl[d]
		b.	Booster Pellet (M125 series)	22 grams	Tetryl[d]
	2.	Detonator, M18			
		a.	Upper Charge	65 mg	Overall Mixture:33.5% Potassium Chlorate, 32.2% Antimony Sulfide, 28.3% Lead Azide, 5.0% Carborundum
		b.	Intermediate Charge	191 mg	Lead Azide
		c.	Lower Charge	80 mg	Tetryl[d]
M2A1(4.2-inch mortar)	1.	Fuze, M8			
		a.	M14 Burster Assembly	65.2 grams	Tetryl[d]
	2.	Detonator, M18			
		a.	Upper Charge	50 mg	Overall Mixture: 33.5% Potassium Chlorate, 32.2% Antimony Sulfide, 28.3% Lead Azide, 5.0% Carborundum
		b.	Intermediate Charge	157 mg	Lead Azide

Table 2-C-2 COMPOSITION OF REACTIVE MATERIAL IN MUNITIONS					
MUNITION	**COMPONENT**			**WEIGHT**	**COMPOSITION**
		c.	Lower Charge	70 mg	Tetryl[d]

Notes:
[a] RDX = cyclotrimethylenetrinitramine; $N(NO_2)CH_2N(NO_2)CH_2N(NO)_2CH_2)$
[b] Composition B = 60% RDX, 39.5% TNT, 0.5% calcium silicate
[c] TNT = 2,4,6-trinitrotoluene; $CH_3C_cH_2(NO_2)_3$
[d] Tetryl = 2,4,6-trinitrophenylmethylnitramine; $(NO_2)_3C_6H_2N(N)_2)CH_3$

ATTACHMENT 6
INSTRUMENT CALIBRATION PLAN
&
INCINERATOR WASTE FEED INTERLOCK FUNCTION TEST

Table Of Contents

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LIST of TABLES

List of Acronyms

ACAMS	Automatic Continuous Air Monitoring System
ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRA	Brine Reduction Area
CEMS	Continuous Emission Monitoring System
DFS	Deactivation Furnace System
HWMU	Hazardous Waste Management Units
LIC	Liquid Incinerator System
MDM	Multipurpose Demilitarization Machines
MPF	Metal Part Furnace System
PAS	Pollution Abatement System
PDAR	Process Data Acquisition and Recording
PLC	Programmable Logic Controller
RCRA	Resource Conservation Recovery Act
RSM	Rocket Shear Machine
SDS	Spent Decontamination System
TOCDF	Tooele Chemical Agent Disposal Facility

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6.1 SCOPE

6.1.1 This Calibration Plan:

6.1.1.1 Describes the basis for assigning TAG IDs to the various instruments and alarms associated with components of the process control systems for Subpart X treatment units, tanks, and incinerators.

6.1.1.2 Identifies components of the process control system associated with an incinerator requiring proper operation to ensure proper waste treatment, to stop/prevent the feeding of hazardous waste to an incinerator should the magnitude of permit regulated operating parameters exceed limits imposed by permit condition, and to demonstrate compliance with the conditions of this Permit.

6.1.1.3 Identifies components of the process control system associated with permitted tank requiring proper operation to determine accurate volumes of liquid wastes stored in tanks, to prevent the overtopping of tanks, and to demonstrate compliance with Permit conditions limiting the volume of hazardous waste stored in tanks.

6.1.1.4 Identifies components of the process control system associated with permitted Subpart X treatment unit requiring proper operation to ensure proper waste treatment, to stop/prevent the feeding of hazardous waste to Subpart X treatment unit, should the magnitude of permit regulated operating parameters exceed limits imposed by permit condition, and to demonstrate compliance with the conditions of this Permit.

6.1.1.5 Differentiates between instrumentation calibrated by the user and instrumentation calibrated by the manufacturer.

6.1.1.6 Differentiates between instrumentation that is calibrated and function tested, and instrumentation that is function tested only.

6.1.1.7 Describes the methods used to verify operational accuracy (i.e., function test) and calibrate different types of process control instrumentation associated with the demonstration of compliance with the conditions of this Permit.

6.1.1.8 Describes the methods used to function test the waste feed interlock system associated with each incinerator, the overtop protection system associated with each tank, and those interlocks associated with the Brine Reduction Area (BRA) Subpart X treatment unit.

6.2 INSTRUMENT/ALARM TAG ID NOMENCLATURE

6.2.1 A unique TAG ID is used to identify each instrument and alarm. An instrument's TAG ID is stamped on a tag physically attached to (or in close proximity to) the instrument. Each instrument TAG ID is comprised of a two-digit prefix "system identifier," followed by a three or four-letter "instrument type identifier," followed by a one to three-digit suffix "instrument number."

6.2.2 The two-digit prefix "system identifier" and the corresponding systems are presented below:

SYSTEM IDENTIFIER	CORRESPONDING SYSTEM
11-XXX-XXX	Toxic Cubicle (TOX) Includes Agent Collection System associated with ACS-TANK-101 & ACS-TANK-102 and Spent Decontamination System associated with SDS-TANK-101, SDS-TANK-102 & SDS-TANK-103
13-XXX-XXX	Liquid Incinerator Systems (LIC 1, & LIC 2)
14-XXX-XXX	Metal Part Furnace System (MPF)
16-XXX-XXX	Deactivation Furnace System (DFS)
23-XXX-XXX	Brine Reduction Area System including: BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, BRA-TANK-202, BRA-EVAP-101, BRA-EVAP-201, BRA-DDYR-101, BRA-DDYR-102, and BRA–DDYR-201
24-XXX-XXX	Incinerator Pollution Abatement Systems: LIC 1 PAS, LIC 2 PAS, MPF PAS, & DFS PAS
27-XXX-XXX	Brine Reduction Area Pollution Abatement System including BRA PAS Baghouse Modules: BRA-SEPA-101, BRA-SEPA-102, BRA-SEPA-103, and BRA-SEPA-104
49-XXX-XXX	Bulk Drain Station (BDS) Agent Quantification System associated with the Bulk Drain Stations (i.e., load cells): BDS-101, & BDS-102
51-XXX-XXX	Agent Collection System (ACS) Agent Quantification Systems associated with the Rocket Shear Machines: RSM-101, & RSM-102, and the Multipurpose Demil Machines: MDM-101, MDM-102, & MDM-103

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11-XXX-XXX

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Spent Decontamination System including: SDS-TANK-101, SDS-TANK-102, & SDS-TANK-103

6.2.3 The following three or four-letter codes are used to identify different types of instruments:

3-4 LETTER CODES	INSTRUMENT TYPE
XX-AIT-XXX	Analyzer Indicator Transmitters includes Continuous Emission Monitors for oxygen, carbon monoxide, & carbon dioxide, and pH analyzers
XX-DIT-XXX	Density Indicator Transmitters
XX-FIT-XXX	Flow Indicator Transmitters
XX-LIT-XXX	Level Indicator Transmitters
XX-PIT-XXX	Pressure Indicator Transmitters
XX-PDIT-XXX	Pressure Differential Indicator Transmitters
XX-PDT-XXX	Pressure Differential Transmitters
XX-TIT-XXX	Temperature Indicator Transmitters
XX-WIT-XXX	Weight Indicator Transmitters
PAS-XXX	Chemical Agent Monitors

6.2.4 The three-digit numeric suffix is used to differentiate between individual instruments of the same type.

6.2.5 Even though instruments of the same type share the same three or four-letter "instrument type identifier" code, and some instruments share the same one to three-digit suffix, a unique TAG ID exists for each instrument since the complete TAG ID is composed of 1) the System ID Code, 2), the three or four-letter instrument type identifier and 3) the one to three-digit suffix instrument number.

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6.2.6 TAG IDs describing alarm and switch waste feed interlocks are derived from the instrument TAG IDs by replacing the last two letters in the instrument type identifier code with one of the following combinations of letters:

TAG ID	ALARM & SWITCH FEED INTERLOCK
XX-XAL-XXX	Alarm Low
XX-XALL-XXX	Alarm Low Low
XX-XDALL-XXX	Differential Alarm Low Low
XX-XSLL-XXX	Switch Low Low
XX-XAH-XXX	Alarm High
XX-XAHH-XXX	Alarm High High
XX-XDAH-XXX	Differential Alarm High
XX-XSHH-XXX	Switch High High

6.2.7 The "A" and "S" letters in the waste feed interlock TAG ID are used to differentiate between waste feed interlocks activated by switches located in the field and waste feed interlocks activated by monitored process values exceeding setpoints established in the Programmable Logic Controller (PLC) software.

6.2.7.1 "A" designates a waste feed interlock that is activated when the magnitude of the four to 20 milliamp control signal output from a specific transmitter exceeds a setpoint established in the PLC software. The transmitter sending the control signal causing the waste feed interlock can be determined by associating the first letter in the waste feed interlock TAG ID with the three-digit suffix. As an example, 13-TAHH-610 (Temperature Alarm High High) is generated when the control signal output from temperature transmitter 13-TIT-610 which monitors the exhaust gas temperature of the LIC 1 primary chamber exceeds the setpoint established in the PLC software.

6.2.7.2 The instrument causing the waste feed interlock is the transmitter sending the control signal, referring to the above example, 13-TIT-610. An instrument with the TAG ID 13-TAHH-610 does not exist.

6.2.7.3 "S" designates a change in state of a switch (which can be identified in the field by the TAG ID stamped on the tag attached to the instrument) causes the waste feed interlock. As an example, a pressure above atmospheric in the LIC 1 primary chamber causes 13-PSHH-233 (LIC 1 Pressure Switch #233 High High) to open. When this switch is open, waste feed is stopped/prevented.

6.3 INSTRUMENT CALIBRATION & PREVENTATIVE MAINTENANCE METHODS[1]

6.3.1 Overview

[1] In this plan, the tolerance or accuracy to which an instrument is calibrated is expressed as "percent of span." Span is defined as the arithmetic difference between an instrument's lower and upper range.

6.3.1.1 Preventative maintenance performed on components of the TOCDF incinerators, tank, and BRA process control systems consists of function/accuracy tests and/or re-calibration.

6.3.1.2 Preventative maintenance on user-calibrated instrumentation consists of function/accuracy tests and re-calibration if necessary.

6.3.1.3 A commercially available process instrumentation calibration system is used at the TOCDF. The calibration system allows the user to download data specific to each instrument to be calibrated. The downloaded calibrator is then taken to the field and used to input (or used to enable the input of) artificial process values into the instrument being calibrated. As the artificial process values are being input, the calibrator compares and records the instruments output. Depending on the output, the instrument is either left as is, or adjusted so that the output is within the pre-established percentage of the expected value.

6.3.1.4 The "as found" and "as left" outputs of the instrument are recorded by the calibrator. Calibration results are then downloaded from the calibrator to a database and both an electronic and hard copy record of each calibration event are maintained.

6.3.1.5 For instrumentation calibrated by the manufacturer, preventative maintenance performed by the user consists of periodic accuracy/function tests only.

6.3.1.6 The results of function tests are not recorded in the instrument calibration system database for instruments calibrated by the manufacturer. Proper calibration of manufacturer-calibrated instruments is demonstrated by the certificate of calibration provided by the manufacturer and the completed preventative maintenance procedure log sheet.

6.3.1.7 At the conclusion of each function/accuracy test (and re-calibration if necessary) the validity of the data being sent by the transmitter to the control room advisor screen is tested by a procedure referred to as a "loop check".

6.3.1.8 Loop checks are accomplished through coordination between the instrument technician performing the calibration and control room operators. The instrument technician injects various artificial control signal values into the instrument and informs the control room operator of the magnitude of the injected value. The control room operator then determines (by knowing the strength of the signal being injected and the span over which the transmitter is calibrated to) the accuracy of the entire control loop. The results of loop checks are recorded on log sheets that are kept on file and attached to the hard copy of each function/accuracy test result and/or calibration event.

6.4 INSTRUMENT PREVENTATIVE MAINTENANCE/CALIBRATION METHODS

6.4.1 Analyzer Indicator, Transmitters (XX-AIT-XXX)

6.4.1.1 Continuous Emission Monitoring Systems

6.4.1.1.1 The certification and calibration of hazardous waste incinerator exhaust gas CO and O_2 Continuous Emission Monitoring Systems (CEMS) are regulated by Federal Regulations found in 40 CFR 266, Appendix IX.

6.4.1.1.2 These regulations specify required methods, frequencies, and accuracies to which the CEMS must be certified, calibrated, and audited. These include daily Calibration Drift (CD) tests, quarterly Calibration Error (CE) tests, and annual performance specification tests (PSTs).

6.4.1.1.3 CO and O_2 CEMS will be managed (i.e, certified, calibrated and audited) as specified in 40 CFR 266, Appendix IX and outlined in the TOCDF CEMS Monitoring Plan (CDRL 06).

6.4.1.2 <u>pH Analyzers</u>

6.4.1.2.1 pH analyzers are used to control the capability of PAS scrubber solutions to absorb acid gases exhausted by the incinerators. The PAS process control system of each incinerator is equipped with two analyzers monitoring scrubber brine pH. Both analyzers sample the same location in the process stream. Only one analyzer is active at any one time. The active analyzer is used to control pH. The analyzer designated to be active is alternated at equal intervals.

6.4.1.2.2 pH analyzers are calibrated by immersing the sensing element in certified buffer solutions at a pH of 4, 7, and 10 and observing the pH analyzer transmitter's output. The transmitter is determined to be properly calibrated if the output of the transmitter is within ±2.0% of the expected value. pH analyzer transmitters are calibrated at least once every seven days.

6.4.1.2.3 As the calibration history on each pH analyzers develops, the users will be able to determine the stability of the analyzer (i.e., the tendency of the analyzer's transmitter to drift out of calibration).

6.4.1.2.4 If waste feed to an incinerator is discontinued for a period longer than seven days, calibration of the pH analyzer/transmitter associated with the incinerator is suspended but will be done prior to the resumption of waste feed.

6.4.2 **<u>Density Indicator, Transmitters (XX-DIT-XXX)</u>**

6.4.2.1 The density of Pollution Abatement System scrubber brine solutions for each incinerator is measured by a vibrating tube type primary sensing element and paired transmitter.

6.4.2.2 The accuracy of the primary sensing element is established by the manufacturer through the design. The calibration of the associated transmitter is done by the manufacturer and is valid over the operational lifetime of the primary sensing element/transmitter pair. The manufacturer provides the user with a certificate of calibration for each density primary sensing element/transmitter pair. The user programs the transmitter per manufacturer instructions.

6.4.2.3 The function and accuracy of the sensing element/transmitter pair is checked by taking a sample of the scrubber brine and determining the samples density by weighing the sample or using a hydrometer.

6.4.2.4 If the density of the sample is within ±2.0% of the value reported by the sensing element/transmitter pair, the instrument is determined to be functioning properly.

6.4.2.5 Proper operation of each density primary sensing element/transmitter pair is tested at least once every 180 days.

6.4.3 **Flow Indicator, Transmitters (XX-FIT-XXX)**

6.4.3.1 Flow rates of incinerator liquid waste feeds, incinerator PAS solutions, and incinerator exhaust gases are determined using mass flow meters, magnetic flow meters, and differential pressure sensors respectively.

6.4.3.2 Mass Flow Meters

6.4.3.2.1 Mass Flow Meters are used to measure the feed rate of chemical agent and spent decontamination solution to the primary and secondary chambers of the Liquid Incinerators. Each mass flow meter consists of a vibrating tube type primary sensing element and a transmitter, which are calibrated by the manufacturer. Mass flow meters are not calibrated by the user, rather the manufacturer provides the user with a certificate of calibration for each flow meter. The manufacturers calibration is valid over the life of the instrument. For mass flow meters, the instrument error increases as the flow rate decreases. The instrument calibration will be maintained such that the accuracy is within ±0.4% at all flow rates above 10% of the maximum design flow rate.

6.4.3.2.2 The TOCDF uses two mass flow meters in series to measure the feed rate of chemical agent to the primary chamber of each Liquid Incinerator. This ensures accurate measurements of agent feed rates and the ability to determine proper operation of the mass flow meters. If the agent feed rates reported by each flow meter are within 5% of each other, the flow meters are determined to be functioning properly. If the flow rate values from each flow meter differ by greater than 5%, the flow meter causing the error will be repaired or replaced with a new factory calibrated one. The mass flow meter causing the error is determined by physical inspection and/or component continuity checks as described in literature provided by the manufacturer.

6.4.3.2.3 Since mass flow meters are calibrated by the manufacturer, preventative maintenance performed by the user is limited to checking the "zero value" of each flowmeter (i.e., at flow rates of 0.0 lbs/hr transmitter output should be 4.0 milliamps) and resetting the "zero value" if necessary. The "zero value" of each mass flow meter is checked at least once every 180 days.

6.4.3.3 Electro-Magnetic Flow Meters

6.4.3.3.1 Electro-Magnetic Flow Meters are comprised of a primary sensing element and a transmitter. The primary sensing element is located in a section of piping of known cross sectional area. The accuracy of the primary sensing element is established by the manufacturer through the design.

6.4.3.3.2 The transmitter associated with each magnetic flow meter is calibrated by the user. A frequency generator integrated within the transmitter as part of the flow meter's self-diagnostic system simulates the flow of liquids through the meter. Frequencies equivalent to zero and 100 percent of span are injected into the transmitter and the resulting milliamp output of the transmitter is evaluated and adjusted if necessary.

6.4.3.3.3 Electro-Magnetic flow meter transmitters are determined to be properly calibrated if the output of the transmitter is the expected value ±1.0% of the transmitter's span. Magnetic flow meters are calibrated at least once every 180 days.

6.4.4 **Differential Pressure Indicator, Transmitters (XX-PDIT-XXX)**

6.4.4.1 Differential pressure measurements are used to determine flow rates of exhaust gases through each incinerator. A differential pressure measurement requires a transmitter capable of receiving and measuring the difference between a low and a high-pressure input.

6.4.4.2 Differential pressure indicating transmitters are calibrated by removing the low and high-pressure inputs to the transmitters. The low-pressure leg of the transmitter is then exposed to atmospheric pressure. The high-pressure leg of the transmitter is exposed to five successive increasing pressures using either a hand pump or compressed gas.

6.4.4.3 The transmitter is determined to be properly calibrated if the four to 20 milliamp output of the transmitter (when exposed to each of the five successive pressures) is the expected value ±1.0% of the transmitter's span. Differential pressure transmitters are calibrated at least once every 360 days.

6.4.5 **Level Indicator, Transmitters (XX-LIT-XXX)**

6.4.5.1 Levels of liquids stored in permitted hazardous waste tanks, the BRA Evaporators, the nip volume between the drums of the BRA Drum Dryers, and small vessels associated with the Agent Quantification System are determined using either differential pressure transmitters, or ultrasonic or radar level sensors.

6.4.5.2 Differential Pressure Transmitters

6.4.5.2.1 Differential pressure transmitters are designated in the TAG ID alpha code with the letters LIT when used in liquid level measurement applications. The low-pressure leg of the transmitter is exposed to atmospheric pressure, while the high pressure leg is exposed to the pressure head created by the column of liquid stored in the tank.

6.4.5.2.2 Differential pressure transmitters used in tank liquid level applications are calibrated in the same manner and at the same frequency as those used to determine incinerator exhaust gas flow rates (i.e., XX-PDIT-XXX).

6.4.5.3 Ultrasonic and Radar Level Transmitters

6.4.5.3.1 Ultrasonic level sensors determine the distance between the liquid level surface and the face of the level sensor by measuring the time required for a sound pulse sent out from the sensor to be reflected off the liquid surface and return to the sensor. Radar level indicators make this same measurement using a radio frequency pulse.

6.4.5.3.2 The function/accuracy of ultra sonic level detector is tested using features included in the sensor/transmitter pair. The sensor generates artificial inputs to the transmitter at a frequency equivalent to that which the transmitter would receive if the tank were empty. The sensor then repeats the process, generating inputs to the transmitter at a frequency equivalent to that which the transmitter would receive if the tank were full.

6.4.5.3.3 The output from the transmitter should be four and 20 milliamps respectively ±1.0% of the transmitter's span. Ultrasonic and radar transmitters are calibrated at least once every 180 days or 360 days as specified in the tables at the end of this Attachment.

6.4.6 **Level Switches (XX-LSHH-XXX)**

6.4.6.1 Sonic level switches are used in permitted tank control systems to prevent the tanks from being filled beyond their capacities. Level switches are function checked to ensure proper operation by removing the switch and immersing it in liquid. The function of each level switch is tested at least once every 360 days.

6.4.7 **Temperature Indicator, Transmitters (XX-TIT-XXX, XX-TT-XXX)**

6.4.7.1 Temperature transmitters are calibrated using a hand-held calibrations instrument, which simulates the thermocouple millivolt, output that is input to the transmitter by the thermocouple.[2] Five calibration points are injected into the transmitter and the resulting milliamp outputs are evaluated.

6.4.7.2 The transmitter is determined to be properly calibrated if the four to 20 milliamp output of the transmitter is the expected value ±1.0% of the instrument's span. Temperature transmitters are calibrated at least once every 90 days or 180 days as specified in the Tables at the end of this Attachment.

6.4.8 **Current Switches (XX-TSLL-XXX and XX-PSHH-XXX)**

6.4.8.1 Current switches are used in some temperature and pressure control loops to activate waste feed interlocks. The current switch is placed in series after the temperature or pressure transmitter. The current switch is adjusted so that it opens/closes at a threshold milliamp value (i.e., the setpoint). Current switches are calibrated using a hand-held calibrator, which simulates the input normally provided by a temperature or pressure transmitter.

6.4.8.2 Each current switch is determined to be in calibration when it activates at a milliamp value equivalent to the setpoint ±1.0% instrument's span. Current switches are calibrated at least once every 360 days.

6.4.9 **Temperature Switches (XX-TSHH-XXX)**

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[2] Thermocouples are not calibrated. The accuracy of a thermocouple over a specific temperature range is determined by the materials of construction and design.

6.4.9.1 Filled-system-type temperature switches are used on each incinerator to stop or prevent waste feed if an incinerator's PAS quench tower exhaust gas temperature exceeds the limit established through Permit conditions. Filled-system-type temperature switches are calibrated by exposing the sensing element of the switch to a region of known temperature.

6.4.9.2 Each temperature switch is determined to be properly calibrated if the switch activates at temperatures equivalent to the setpoint ±1.0% of the transmitter's span. Filled-system-type temperature switches are calibrated at least once every 360 days.

6.4.10 **<u>Pressure Indicator, Transmitters (XX-PIT-XXX)</u>**

6.4.10.1 Diaphragm-type pressure sensors are used to measure and/or control process operating parameters associated with each incinerator's primary chamber pressure, quench brine delivery pressure to venturi scrubbers, and clean liquor delivery pressure to scrubber tower spray bars.

6.4.10.2 The transmitter associated with diaphragm-type pressure sensors are calibrated using a hand air pump or compressed gas to pressurize the diaphragm. The diaphragm is subjected to five different pressures ranging from 0 to 100% of the pressures the transmitter is set to span. The resulting output of the transmitter is then evaluated.

6.4.10.3 Pressure transmitters are determined to be properly calibrated if the transmitter's four to 20 milliamp output is the expected value ±1.0% of the instrument's span. Pressure transmitters are calibrated at least once every 180 days.

6.4.11 **<u>Pressure Switches (XX-PSHH-XXX, XX-PSL-XXX, XX-PSLL-XXX)</u>**

6.4.11.1 Pressure Switches are used to stop or prevent waste feed to each incinerator when primary chamber pressures exceed limits imposed by this Permit. Pressure switches are calibrated by injecting a pressure into the switch equivalent to the switch’s setpoint.

6.4.11.2 Pressure switches (PSHH) are determined to be properly calibrated if the switch activates at pressures equivalent to the setpoint ±3.0% of the instrument's span. Pressure switches are calibrated at least once every 180 days.

6.4.11.3 Pressure switches (PSL and PSLL) are determined to be properly calibrated if the switch activates at pressures equivalent to the setpoint ±1.0% of the instrument's span. Pressure switches are calibrated at least once every 180 days.

6.4.12 **<u>Weight Indicator, (Transmitters XX-WIT-XXX)</u>**

6.4.12.1 Load Cells are used <u>in the determination of</u> the heel of chemical agent remaining in bulk containers drained at the Bulk Drain Stations and control the feed rate of chemical agent to the Metal Parts Furnace. <u>The</u> load cells <u>may</u> be used to weigh the miscellaneous wastes to the MPF to verify that permit feed rates are not exceeded. They may also be used to quantify the amount of miscellaneous agent contaminated liquids (hydraulic fluid, fuel oil, lubricating oil, etc.) that will be transferred to the ACS tanks.

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6.4.12.2 The transmitters associated with load cells convert and scale the millivolt output of the load cell to a four to 20 milliamp control signal. A calibrator is used to simulate the millivolt output of the load cell to the transmitter. The resulting output of the transmitter is then evaluated. Load cell transmitters are determined to be properly calibrated if the output of the transmitter resulting from a known input is that which is expected ±0.2% of the instrument's span. Transmitters associated with the load cells are calibrated at least once every 90 days.

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6.4.12.3. A scale in the TMA may also be used to quantify the amount of miscellaneous waste and miscellaneous agent contaminated liquids (hydraulic fluid, fuel oil, lubricating oil, etc.) that will be transferred to the ACS tanks. This scale will be calibrated once every 90 days by placing a known weight on the scale and adjusting the scale as necessary to obtain an accuracy of ±0.2% of the scales range. A record of this yearly calibration date, with results, shall be kept at the facility until the next calibration has been completed.

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6.4.13 **Chemical Agent Monitors**

6.4.13.1 Automatic Continuous Air Monitoring Systems (ACAMS) are used to detect concentration of agent in exhaust gases.

6.4.13.2 The calibration and challenging of ACAMS is described in Attachments 3 (Sampling, Analytical, and QA/QC Procedures) and 22 (Agent Monitoring Plan).

6.5 **R315-8-15.7(c) INCINERATOR WASTE FEED INTERLOCK FUNCTION TEST**

6.5.1 The process control system of each incinerator is designed to stop or prevent waste feed when operating parameters exceed the limits specified in this Permit. This feature of the control system is referred to as the automatic waste feed cut-off (or waste feed interlock) system. Hazardous Waste regulations require owners and operators of an incinerator to periodically test this system.

6.5.2 The TOCDF procedure titled "Waste Feed Interlock Testing" (Document Number TE-SOP-301) specifies the interlock that must be tested, the methods used to test the interlocks, and the frequencies at which the tests are to be conducted. The procedure includes examples of the forms used to document the test results.[3]

6.5.3 The waste feed interlocks are tested using one of two methods: (1) an automated method using PLC software that allows inputs of simulated signals into the logic of the field PLCs; or (2) a manual method that is used as a backup if the automated method is not functional. The Permittee shall document in the Operating Record the reason(s) why the automated method was not used and the action(s) taken to correct any problems with the automated method. Waste shall not be fed to the affected furnace(s) during the waste feed interlock test. The manual backup method for testing the waste feed interlocks is as follows:

[3] The procedure to test the overtop protection systems associated with tanks as required by R315-8-10 [40 CFR 264.195(a)] and the waste feed interlocks associated with the BRA Subpart X treatment unit are included in this procedure.

6.5.3.1 Waste feed interlocks are either activated when the four to 20 milliamp control signal output from a transmitter exceeds a setpoint residing in the process control software or when the value of a process parameter exceeds the setpoint of a switch and causes the switch to open.

6.5.3.2 For waste feed interlocks activated when the magnitude of operating parameters cause the analog value of the four to 20 milliamp control signal output from a transmitter to exceed a setpoint residing in the process control software, the instrument technician injects an artificial control signal into the process control system that is greater or less than the value equivalent to the setpoint. The artificial control signal is injected at the location where the transmitter's output leads connect to the programmable logic controller.

6.5.3.3 For waste feed interlocks activated by a change in state of a switch (i.e., contacts closed to contacts open), the instrument technician will cause a change in state of the control loop associated with the interlock being tested by opening (or removing) the fuse to the loop.[4]

6.5.3.4 The ACAMS associated with the waste feed interlocks are tested either automatically or manually as described in Section 6.5.3. Each ACAMS is tested for a malfunction alarm. The ACAMS associated with the common stack are additionally tested for a "non-staggered" alarm.

6.5.4 The automated testing method produces a report documenting the testing of the waste feed interlocks that is prepared using a feature included with the waste feed interlock function test software. The alarms associated with the interlock function test shall be observed and verified by the Control Room Operator of the affected furnace. The observed time of each interlock alarm shall be included with the report. When using the manual backup testing methods, the control room operator observes the activation of each waste feed interlock on the incinerator-specific "RCRA Alarm Summary Screen" and records the time of its activation.

6.5.4.1 The reports of the interlock function tests and alarm verifications for each furnace system and tank system shall be included in the Operating Record.

6.5.4.2 The interlock function test report shall verify that all appropriate interlocks occur (e.g., the common stack ACAMS alarm causes an interlock to automatically prevent the waste feed to all of the furnaces.)

6.5.5 Proper function of the entire waste feed interlock system is demonstrated by:

6.5.5.1 The proper operation of instrumentation causing waste feed interlocks is ensured and demonstrated by compliance with the calibration methods and frequencies established in the calibration plan,

6.5.5.2 Successful completion of the waste feed interlock function test demonstrates the absence of hardwire jumpers, software jumpers, or both within the portion of the process control logic (i.e., software) that stops and prevents waste feed.

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[4] The Level Switch High High (LSHH), which when activated, prevents continued liquid feed to tank HWMU are tested the same way as incinerator waste feed interlocks that are activated by switches.

6.5.5.3 Successful completion of the waste feed interlock function test demonstrates the proper function of the PLC, the PLC code associated with stopping or preventing waste feed, and the values of the setpoints used to stop or prevent waste feed.

6.5.5.4 The design of the control system includes continual control loop self diagnostic checks. The process control system components are designed to fail safe (e.g., a failed thermocouple causes the associated transmitter to ramp to its high range, which in turn activates a waste feed interlock).

6.5.6 The waste feed interlocks required to be tested are those associated with operating parameters which have a corresponding Permit Condition limitation.

6.5.7 The frequency at which the testing of the waste feed interlock system of each incinerator occurs is at least once every 14 days unless the incineration system has been shut down. If the incineration system has been shut down, the waste feed interlock system will be tested before waste feed is introduced. The interlock system shall be tested every 14 days when the furnace is idling or processing waste. Waste feed shall not occur to the effected incinerator during the waste feed interlock test.

6.5.8 The frequency of testing of the overtop protection system of each tank is at least once every 14 days.

6.5.9 The frequency of testing of the BRA waste feed interlock system is at least once every 14 days.

6.5.10 Although minor modifications to the procedure may occur, portions of the procedure that shall not be changed without prior approval by the Executive Secretary are:

6.5.10.1 The methods used to test waste feed interlocks.

6.5.10.2 The interlocks required to be tested.

6.5.10.3 The frequency at which the function test occurs which is specified as once every 14 days, as indicated in Section 6.5.7.

6.6 PROCESS DATA INSTRUMENTATION CALIBRATION & WASTE FEED INTERLOCK TABLES

6.6.1 The following tables list (by incinerator, Subpart X, and tank) the TAG IDs of process instrumentation whose proper function is required to demonstrate compliance with Permit conditions and stop or prevent waste feed when operating parameters exceed the limits established through the Conditions of this Permit.

6.6.2 Under the column heading "Process Data Instrument TAG ID," transmitters are referenced rather than control loops because it is the transmitters that physically exist as instruments. It is the transmitters that must be calibrated properly to ensure precise process control and accurate data generation.

6.6.3 Process data generated from the output of these transmitters is electronically recorded by the Process Data Acquisition & Recording System (PDARS). The outputs of the transmitters listed are continuously monitored by the Programmable Logic Controllers (PLC), however process variables residing in the registers of the PLC are recorded by PDARS.

6.6.4 The activation and duration of waste feed interlocks (listed in the following tables by alarm/switch TAG IDs) are recorded by PDARS also.

6.6.5 PDARS reports are formatted to present the hourly maximum and minimum values of each parameter listed.

6.6.6 The tables for all incinerators list two scrubber brine pH analyzer transmitter TAG IDs (A and B). The value appearing on the PDARS report associated with each incinerator is the "process variable" (a value that exists in a register of the controller which is the actual pH of the scrubber brine that is compared by the PLC to the setpoint). Each scrubber brine pH analyzer is a complete separate system. Only one of the pH analyzer systems is active at any one time and the system that is active is rotated on equal time intervals. It is the active system that provides the process variable to the controller and it is the process variable that appears on the PDARS reports.

6.6.7 Each exhaust gas carbon monoxide (CO) 60-minute rolling average is composed of the previous 60 one-minute averages. Each one-minute average is composed of four instantaneous CO readings taken 15 seconds apart.

6.6.8 Tables 6-B and 6-C include control loop temperature TAG IDs appearing in bold print. Controller algorithms manipulate the output of both transmitters to determine the process variable as follows:

6.6.8.1 The controller averages the output of both transmitters if the transmitter outputs differ by less than 32° F.

6.6.8.2 The controller uses the transmitter with the highest output if the transmitter outputs differ by greater than 32° F and the associated waste feed interlock is activated when the temperature becomes greater than the setpoint value.

6.6.8.3 The controller uses the transmitter with the lowest output if the transmitter outputs differ by greater than 32° F and the associated waste feed interlock is activated when the temperature becomes less than the setpoint value.

6.6.8.4 The controller uses the transmitter with the lowest output if the transmitter outputs differ by greater than 32° F and the high transmitter's output is at full scale (i.e. 20 milliamps, or maximum instrument range).

TABLE 6-A-1
LIQUID INCINERATOR #1
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device*	Instrument Range	Accuracy	Calibration/Preventative Maintenance Frequency	Calibration/Preventative Maintenance Method
1	Agent Feed Rate to Primary Chamber	13-FIT-127A 13-FIT-127B	Mass Flowmeter Vibrating U-Tube Type	0 - 1,500 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
2	Agent Feed Atomizing Air Pressure	13-PIT-128	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
3	Agent Gun Nozzle Pressure	13-PIT-112	Diaphram	0 - 25 psig	± 1.0% of Span	180 days	6.4.10
4	Reserved						
5	Primary Chamber Exhaust Gas Temperature	13-TIT-610	Thermocouple	212 - 3,000° F	± 1.0% of Span	180 days	6.4.7
6	Secondary Chamber Spent Decon/Process Water Feed Rate	13-FIT-102	Mass Flowmeter Vibrating U-Tube Type	0 - 2,250 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
7	Secondary Chamber Spent Decon/Process Atomizing Air Pressure Waste Feed Interlock	13-PSL-058	Diaphragm	12 - 100 psig	± 1.0% of Span	180 days	6.4.11
8	Secondary Chamber Slag Gate Open Waste Feed Interlock	13-ZS-367B	Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicabl
9	Secondary Chamber Exhaust Gas Temperature	13-TIT-129	Thermocouple	32 - 2,400° F	± 1.0% of Span	180 days	6.4.7
9.a	Secondary Chamber Exhaust Gas Temperature Low Gas Temperature Waste Feed Interlock	13-TSLL-129	Current Switch	4 - 20 mA	± 1.0% of Span	360 days	6.4.8
10	Slag Removal System Shell	13-TIT-374 13-TIT-375 13-TIT-376 13-TIT-377	Thermocouples	0 - 1000° F	± 1.0% of Span	180 days	6.4.7
11	V-Cone	24-PIT-9431	Diaphram	8-13 psia	± 1.0% of Span	180 days	6.4.1
11a	V-Cone	24-TIT-9431	Thermocouple	100-200° F	± 1.0% of Span	180 days	6.4.7
12	Quench Tower Exhaust Gas Temperature	24-TIT-397	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
12.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-089	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
13	Quench Brine Delivery Pressure	24-PIT-100	Diaphragm	0 - 150 psig	± 1.0% of Span	180 days	6.4.10
14	Quench Brine to Venturi Scrubber	24-FIT-088	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
15	Venturi Scrubber Δ Pressure	24-PDIT-090	D/P Cell	–0-70in. w.c.	± 1.0% of Span	360 days	6.4.4
16	Clean Liquor to Scrubber Tower Sprays	24-FIT-112	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
17	Clean Liquor Delivery Pressure	24-PIT-129	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
18	Scrubber Liquid Effluent pH	24-AIT-091A 24-AIT-091B	Electrodes	0 - 14 pH Units	± 2.0% of Span	7 days	6.4.1.2
19	Scrubber Liquid Effluent Specific Gravity	24-DIT-083	Magnetically Vibrated Tube	0.6 - 1.4 SGU	± 2.0% of Span	180 days	6.4.2
20	Blower Exhaust Gas CO	24-AIT-078	Infrared Cell Analyzer	0 - 200 & 0 -	± 3.0% of	CD: daily	6.4.1.1

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TABLE 6-A-1
LIQUID INCINERATOR #1
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device*	Instrument Range	Accuracy	Calibration/Preventative Maintenance Frequency	Calibration/Preventative Maintenance Method
				5,000 ppm	Span	CE: quarterly PST: annually	
21	Blower Exhaust Gas CO	13-AIT-083	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
22	Blower Exhaust Gas O_2	24-AIT-210	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
23	Blower Exhaust Gas O_2	13-AIT-229	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
24	Blower Exhaust Gas Agent	PAS 704AH PAS 704BH PAS 704C PAS 704D	ACAMS	0 - 512 /SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
25	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707VH	ACAMS	0 - 512 SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
26	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601DH	ACAMS	0 - 512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601EG[3] FIL 601FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±25% of Response	Line Challenge every 28 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

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TABLE 6-A-2
LIQUID INCINERATOR #2
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration/ Preventative Maintenance Method
1	Agent Feed Rate to Primary Chamber	13-FIT-731A 13-FIT-731B	Mass Flowmeter Vibrating U-Tube Type	0 - 1,500 lbs/hr	±0.4% of Flow	180 days	6.4.3.2
2	Agent Feed Atomizing Air Pressure	13-PIT-736	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
3	Agent Gun Nozzle Pressure	13-PIT-760	Diaphragm	0 - 25 psig	± 1.0% of Span	180 days	6.4.10
4	Reserved						
5	Primary Chamber Exhaust Gas Temperature	13-TIT-710	Thermocouple	212 - 3,000° F	± 1.0% of Span	180 days	6.4.7
6	Secondary Chamber Spent Decon/Process Water Feed Rate	13-FIT-763	Mass Flowmeter Vibrating U-Tube Type	0 - 2,250 lbs/hr	± 0.4% of Flow	180 days	6.4.3.2
7	Secondary Chamber Spent Decon/Process Atomizing Air Pressure Waste Feed Interlock	13-PSL-809	Diaphragm	12 - 100 psig	± 1.0% of Span	180 days	6.4.11
8	Secondary Chamber Slag Gate Open Waste Feed Interlock	13-ZS-567B	Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
9	Secondary Chamber Exhaust Gas Temperature	13-TIT-782	Thermocouple	32 - 2,400° F	± 1.0% of Span	180 days	6.4.7
9.a	Secondary Chamber Exhaust Gas Temperature Low Gas Temperature Waste Feed Interlock	13-TSLL-782	Current Switch	4 - 20 mA	± 1.0% of Span	360 days	6.4.8
10	Slag Removal System Shell	13-TIT-574 13-TIT-575 13-TIT-576 13-TIT-577	Thermocouples	0 - 1000° F	± 1.0% of Span	180 days	6.4.7
11	V-Cone Pressure Production Rate	24-PIT-9902	Diaphram	8-13 psia	± 1.0% of Span	180days	6.4.10
11a	V-Cone Temperature	24-TIT-9902	Thermocouple	100-200°F	± 1.0% of Span	180 days	6.4.7
12	Quench Tower Exhaust Gas Temperature	24-TIT-816	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
12.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-800	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
13	Quench Brine Delivery Pressure	24-PIT-838	Diaphragm	0 -150 psig	± 1.0% of Span	180 days	6.4.10
14	Quench Brine to Venturi Scrubber	24-FIT-828	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
15	Venturi ScrubberΔ Pressure	24-PDIT-814	D/P Cell	–0-70in. w.c.	± 1.0% of Span	360 days	6.4.4
16	Clean Liquor to Scrubber Tower Sprays	24-FIT-825	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
17	Clean Liquor Delivery Pressure	24-PIT-839	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
18	Scrubber Liquid Effluent pH	24-AIT-831A 24-AIT-831B	Electrodes	0 - 14 pH Units	± 2.0 of Span	7 days	6.4.1.2
19	Scrubber Liquid Effluent Specific Gravity	24-DIT-835	Magnetically Vibrated Tube	0.6 - 1.40 SGU	±2.0% of Span	180 days	6.4.2

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TABLE 6-A-2
LIQUID INCINERATOR #2
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration/ Preventative Maintenance Method
20	Blower Exhaust Gas CO	24-AIT-716	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
21	Blower Exhaust Gas CO	13-AIT-778	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
22	Blower Exhaust Gas O_2	24-AIT-717	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
23	Blower Exhaust Gas O_2	13-AIT-798	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
24	Blower Exhaust Gas Agent	PAS 705AH PAS 705BH PAS 705C PAS 705D	ACAMS	0 - 512 SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
25	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	±25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13

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26	HVAC Stack Exhaust Gas Agent[1]	FIL 601 CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601 BV[3]	DAAMS	VSL	±25% of Response	Line Challenge every 28 days	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

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TABLE 6-B
METAL PARTS FURNACE
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Control Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	MPF Primary Chamber Temperature Zone 1	14-TIT-152 14-TIT-391	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
2	MPF Primary Chamber Temperature Zone 2	14-TIT-141 14-TIT-392	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
3	MPF Primary Chamber Temperature Zone 3	14-TIT-153 14-TIT-393	Thermocouple	0 - 2,000° F	± 1.0% of Span	180 days	6.4.7
4	MPF Primary Chamber Exhaust Gas Temperature	14-TIT-010	Thermocouple	0 - 2,282° F	± 1.0% of Span	180 days	6.4.7
5	MPF Primary Chamber Pressure	14-PIT-070	D/P Cell	-10.0 - 0.0 in. w.c.	± 1.0% of Span	180 days	6.4.10
5.a.	MPF Primary Chamber Pressure High Waste Feed Interlock	14-PSHH-034	Current Switch	4 – 20 mA	± 1.0% of Span	360 days	6.4.8
6	MPF Afterburner Temperature	14-TIT-065 14-TIT-069	Thermocouple	32 - 2,700° F	± 1.0% of Span	180 days	6.4.7
7	V-Cone Pressure	24-PIT-9667	Diaphram	8-13 psia	± 1.0% of Span	180 days	6.4.10
7a	V-Cone Temperature	24-TIT-9667	Thermocouple	100-200 °F	± 1.0% of Span	180 days	6.4.7
8	Quench Tower Exhaust Gas Temperature	24-TIT-509	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
8.a	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock	24-TSHH-223	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
9	Venturi Scrubber Differential Pressure	24-PDIT-222	D/P Cell	0 - 50 in. w.c.	± 1.0% of Span	360 days	6.4.4
10	Quench Brine to Venturi Scrubber	24-FIT-218	Electro-Magnetic Flowmeter	0 - 150 gpm	± 1.0% of Span	180 days	6.4.3.3
11	Quench Brine Pressure	24-PIT-233	D/P Cell	0 - 150 psig	± 1.0% of Span	180 days	6.4.10
12	Clean Liquor to Scrubber Tower Sprays	24-FIT-248	Electro-Magnetic Flowmeter	0 - 1,000 gpm	± 1.0% of Span	180 days	6.4.3.3
13	Clean Liquor Delivery Pressure	24-PIT-258	D/P Cell	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
14	Scrubber Liquid Effluent Specific Gravity	24-DIT-216	Magnetically Vibrated Tube	0.6 - 1.4 SGU	±2.0% of Span	180 days	6.4.2
15	Scrubber Liquid Effluent pH	24-AIT-224A 24-AIT-224B	Electrodes	0 - 14 pH Units	± 2.0 pH Span	7 days	6.4.1.2
16	Blower Exhaust Gas CO	14-AIT - 384	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
17	Blower Exhaust Gas CO	24-AIT-669	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
18	Blower Exhaust Gas O_2	14-AIT-082	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
19	Blower Exhaust Gas O_2	24-AIT-670	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
20	Blower Exhaust Gas Agent	PAS 703AH	ACAMS	0 - 512 SEL	± 25% of	Challenge	6.4.13

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TABLE 6-B
METAL PARTS FURNACE
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Control Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
		PAS 703BH PAS 703 C PAS 703D			Response	every 4 hours for VX or 24 hours for GB or mustard calibrate if it fails the challenge	
21	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
22	Load Cell, BDS-101	49-WIT-152	Load Cell	0 -10,000 lbs	±0.20% of Span	Every 90 days	6.4.12
23	Load Cell, BDS-102	49-WIT-252	Load Cell	0 -10,000 lbs	±0.2% of Span	Every 90 days	6.4.12
24	Agent Quantification System MDM-101	51-LIT-073	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
25	Agent Quantification System MDM-102	51-LIT-083	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
26	Agent Quantification System MDM-103	51-LIT-093	DP Level Indicating Transmitter	0-25 in. w.c.	± 1.0% of Span	360 days	6.4.5.2
27	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±25% of Response	Monthly line challenge	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

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TABLE 6-C
DEACTIVATION FURNACE SYSTEM
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENT CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	Jammed Chute Line A Waste Feed Interlock	16-XS-207	Radioactive Proximity Switch	On-Off	Non Applicable	Not Applicable	Not Applicable
2	Jammed Chute Line B Waste Feed Interlock	16-XS-209	Radioactive Proximity Switch	On-Off	Non Applicable	Not Applicable	Not Applicable
3	Agent Feed RateAgent Quantification System RSM-101	51-LIT-051	DP Level Indicating/transmitter	0 to 30in. W.C.	± 1.0% of Span	360 days	6.4.5.2
3.a	Agent Feed RateAgent Quantification System RSM-102	51-LIT-057	DP Level Indicating/transmitter	0 to 30in. W.C.	± 1.0% of Span	360 days	6.4.5.2
4	Rocket Feed Rate RSM-101 & RSM-102		DFS Process Control Software	Not Applicable	Not Applicable	Not Applicable	Not Applicable
5	Kiln Rotational Speed Calculated from:	16-ZX-602	Proximity Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
7	Kiln Pressure	16-PIT-018	Diaphragm	-2.0 to 1.0 in. w.c.	± 1.0% of Span	180 days	6.4.10
7.a	Kiln Pressure High Waste Feed Interlock	16-PSHH-204	Diaphragm	-0.5 to 0.5 in. w.c.	± 3.0% of Span	180 days	6.4.11
8	Kiln Exhaust Temp Pre Quench	16-TIT-182 16-TIT-244	Thermocouple	0 - 2,300° F	± 1.0% of Span	180 days	6.4.7
9	Kiln Exhaust Temp.Post Quench	16-TIT-008 16-TIT-169	Thermocouple	0 - 2,300° F	± 1.0% of Span	180 days	6.4.7
10	Discharge Conveyor Temperature (lower)	16-TIT-042	Thermocouple	0 - 1,600° F	± 1.0% of Span	180 days	6.4.7
11	Discharge Conveyor Temperature (upper)	16-TIT-184	Thermocouple	0 - 1,600° F	± 1.0% of Span	180 days	6.4.7
12	Discharge Conveyor Tip Gate Jam Waste Feed Interlock	16-XS-058	Radioactive Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
13	Discharge Conveyor Slide Gate Jam Waste Feed Interlock	16-XS-821	Radioactive Limit Switch	Not Applicable	Not Applicable	Not Applicable	Not Applicable
14	Discharge Conveyor Speed Low Waste Feed Interlock	16-SSL-057	Speed (Proximity) Switch	On-Off	Not Applicable	Not Applicable	Not Applicable
15	Exhaust Gas Afterburner	16-TIT-092 16-TIT-003	Thermocouple	0 - 2,400° F	± 1.0% of Span	180 days	6.4.7
16	V-Cone Pressure	24-PIT-9430	Diaphram	8-13 psia	± 1.0% of Span	180 days	6.4.10
16a	V-Cone Temperature	24-TIT-9430	Thermocouple	100-200 °F	± 1.0% of Span	180 days	6.4.7
17	Quench Tower Exhaust Gas Temperature	24-TIT-374	Thermocouple	0 - 300° F	± 1.0% of Span	90 days	6.4.7
17.a	Quench Tower Exhaust Gas High Temp Waste Feed Interlock	24-TSHH-001	Filled System	175 - 360° F	± 1.0% of Span	360 days	6.4.9
18	Scrubber Liquid Effluent Specific Gravity	24-DIT-033	Magnetically Vibrated Tube	0.6 - 1.40 SGU	± 2.0% of span	180 days	6.4.2
19	Scrubber Liquid Effluent pH	24-AIT-007A 24-AIT-007B	Electrode	0 - 14 pH Units	± 2.0% Span	7 days	6.4.1.2
20	Quench Brine Pressure	24-PIT-011	Diaphragm	0 - 200 psig	± 1.0% of Span	180 days	6.4.10
21	Quench Brine to Venturi Scrubber	24-FIT-006	Electro-magnetic Flowmeter	0 - 400 GPM	± 1.0% of Span	180 days	6.4.3.3
22	Venturi Scrubber Differential Pressure	24-PDIT-008	D/P Cell	0 - 50 in. w.c.	± 1.0% of Span	360 days	6.4.4
23	Clean Liquor to Scrubber	24-FIT-030	Electro-magnetic	0 - 3,000 GPM	± 1.0% of	180 days	6.4.3.3

TABLE 6-C
DEACTIVATION FURNACE SYSTEM
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENT CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
	Tower Sprays		Flowmeter		Span		
24	Clean Liquor Pressure	24-PIT-036	Diaphragm	0 - 100 psig	± 1.0% of Span	180 days	6.4.10
25	Blower Exhaust Gas O_2	24-AIT-206	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
26	Blower Exhaust Gas O_2	16-AIT-175	Zirconium Oxide Cell Analyzer	0 - 25%	± 0.5% of O_2	CD: daily CE: quarterly PST: annually	6.4.1.1
27	Blower Exhaust Gas CO	24-AIT-207	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
28	Blower Exhaust Gas CO	16-AIT-059	Infrared Cell Analyzer	0 - 200 & 0 - 5,000 ppm	± 3.0% of Span	CD: daily CE: quarterly PST: annually	6.4.1.1
31	Blower Exhaust Gas Agent	PAS 702AH PAS 702BHG PAS 702C PAS 702D	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours for VX or 24 hours for GB, calibrate if it fails the challenge	6.4.13
32	Common Stack Exhaust Gas Agent	PAS 701AG PAS 701BG PAS 701CG PAS 706AV PAS 706BV PAS 706CV PAS 707AH PAS 707BH PAS 707CH	ACAMS	0 - 512 SEL	± 25% of Response	Challenge every 4 hours, calibrate if it fails the challenge	6.4.13
33	HVAC Stack Exhaust Gas Agent[1]	FIL 601CH FIL 601 DH	ACAMS	0-512 VSL	±25% of Response	Challenge every 24 hours[2], calibrate if it fails the challenge	6.4.13
		FIL 601 EG[3] FIL 601 FG[3] FIL 601AV[3] FIL 601BV[3]	DAAMS	VSL	±25% of Response	Monthly Line Challenge	

1. The HVAC ACAMS causes a staged shutdown as described in Module X.
2. The ACAMS shall be challenged every 24 hours with a 1-hour grace period before or after the 24-hour deadline.
3. The GB and VX are historical monitors

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TABLE 6-D
TANK HAZARDOUS WASTE MANAGEMENT UNIT
PROCESS DATA & TANK OVERTOP PROTECTION INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	Agent Collection System ACS-TANK-101 Level Indicator	11-LIT-093	Radar Level Indicating Transmitter	6 - 90 in.	± 1.0% of Span	180 days	6.4.5.3
2	Agent Collection System ACS-TANK-101 High-High Level Interlock	11-LSHH-091	Sonic Level Switch	Interlock setpoint 7' 6" above tangent[2]	See NOTE 3	360 days	6.4.6
3	Agent Collection System ACS-TANK-102 Level Indicator	11-LIT-109	Radar Level Indicating Transmitter	6 - 105 in.	± 1.0% of Span	180 days	6.4.5.3
4	Agent Collection System ACS-TANK-102 High-High Level Interlock	11-LSHH-111	Sonic Level Switch	Interlock setpoint 8' 9" above tangent[2]	See NOTE 3	360 days	6.4.6
5	Spent Decon System SDS-TANK-101 Level Indicator	11-LIT-020	Ultrasonic Level Indicating Transmitter	0 - 107 in.	±1.0% of Span	180 days	6.4.5.3
6	Spent Decon System SDS-TANK-101 High-High Level Interlock	11-LSHH-018	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
7	Spent Decon System SDS-TANK-102 Level Indicator	11-LIT-030	Ultrasonic Level Indicating Transmitter	0 - 107 in.	± 1.0% of Span	180 days	6.4.5.3
8	Spent Decon System SDS-TANK-102 High-High Level Interlock	11-LSHH-028	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
9	Spent Decon System SDS-TANK-103 Level Indicator	11-LIT-064	Ultra Sonic Level Indicating Transmitter	0 - 107 in.	± 1.0% of Span	180 days	6.4.5.3
10	Spent Decon System SDS-TANK-103 High-High Level Interlock	11-LSHH-062	Sonic Level Switch	Interlock setpoint 9' 5" above tangent[2]	See NOTE 3	360 days	6.4.6
11	Brine Reduction Area BRA-TANK-101 Level Indicator	23-LIT-003	Ultra-Sonic Level Indicating/transmitte r	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
12	Brine Reduction Area BRA-TANK-101 High-High Level Interlock	23-LSHH-002	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
13	Brine Reduction Area BRA-TANK-102 Level Indicator	23-LIT-007	Ultra-Sonic Level Indicating/transmitte r	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
14	Brine Reduction Area BRA-TANK-102 High-High Level Interlock	23-LSHH-006	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
15	Brine Reduction Area BRA-TANK-201 Level Indicator	23-LIT-703	Ultra-Sonic Level Indicating/transmitte r	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3
16	Brine Reduction Area BRA-TANK-201 High-High Level Interlock	23-LSHH-702	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6
17	Brine Reduction Area BRA-TANK-202 Level Indicator	23-LIT-707	Ultra-Sonic Level Indicating/transmitte r	0 - 210 in.	± 1.0% of Span	360 days	6.4.5.3

TABLE 6-D
TANK HAZARDOUS WASTE MANAGEMENT UNIT
PROCESS DATA & TANK OVERTOP PROTECTION INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
18	Brine Reduction Area BRA-TANK-202 High-High Level Interlock	23-LSHH-706	Sonic Level Switch	Interlock setpoint 18' 3"	See NOTE 3	360 days	6.4.6

NOTES:
[1] Reserved

[2] The tank tangent is the geometric transition where the cylindrical side meets the ellipsoidal bottom, approximately two inches below the head-to-shell weld.
[3] Level switches are not calibrated, they are function tested. The level at which they activate is not adjustable since each switch is positioned in the tank though a flanged opening in the side of the tank.

TABLE 6-E
BRINE REDUCTION AREA SUBPART X HAZARDOUS WASTE MANAGEMENT UNIT
PROCESS DATA & WASTE FEED INTERLOCK INSTRUMENTATION CALIBRATION

Item No.	Parameter	Instrument Tag ID	Measuring Device	Instrument Range	Accuracy	Calibration/ Preventative Maintenance Frequency	Calibration /Preventative Maintenance Method
1	BRA-EVAP-101 Brine Feed Rate	23-FIT-837	Electro-magnetic Flowmeter	0 - 40 gpm	± 1.0% of span	180 days	6.4.3.3
2	BRA-EVAP-101 Brine Level	23-LIT-757	DP Level Indicating Transmitter	0 - 100.5 in. w.c.	± 1.0% of span	360 days	6.4.4
3	BRA-EVAP-201 Brine Feed Rate	23-FIT-835	Electro-magnetic Flowmeter	0 - 40 gpm	± 1.0% of span	180 days	6.4.3.3
4	BRA-EVAP-201 Brine Level	23-LIT-720	DP Level Indicating Transmitter	0 - 100.5 in. w.c.	± 1.0% of span	360 days	6.4.4
5	BRA-DDYR-101 Brine Feed Rate	23-FIT-851	Electro-magnetic Flowmeter	0 - 13 gpm	± 1.0% of span	180 days	6.4.3.3
6	BRA-DDYR-101 Nip Level	32-LIT-758	DP Level Indicating Transmitter	0 - 14 in. w.c.	± 1.0% of span	360 days	6.4.4
7	BRA-DDYR-102 Brine Feed Rate	23-FIT-872	Electro-magnetic Flowmeter	0 - 13 gpm	± 1.0% of span	180 days	6.4.3.3
8	BRA-DDYR-102 Nip Level	23-LIT-759	DP Level Indicating Transmitter	0 - 14 in. w.c.	± 1.0% of span	360 days	6.4.4
9	BRA-DDYR-201 Brine Feed Rate	23-FIT-903	Electro-magnetic Flowmeter	0 - 13 gpm	± 1.0% of span	180 days	6.4.3.3
10	BRA-DDYR-201 Nip Level	23-LIT-760	DP Level Indicating Transmitter	0 - 14 in. w.c.	± 1.0% of span	360 days	6.4.4
11	BRA PAS Baghouse BRA-SEPA-101	27-PDT-143	D/P Cell	0 - 10 in. w.c.	± 1.0% of span	360 days	6.4.10
12	BRA PAS Baghouse BRA-SEPA-102	27-PDT-144	D/P Cell	0 - 10 in. w.c.	± 1.0% of span	360 days	6.4.10
13	BRA PAS Baghouse BRA-SEPA-103	27-PDT-145	D/P Cell	0 - 10 in. w.c.	± 1.0% of span	360 days	6.4.10
14	BRA PAS Baghouse BRA-SEPA-104	27-PDT-186	D/P Cell	0 - 10 in. w.c.	± 1.0% of span	360 days	6.4.10
15	BRA PAS Pre-Baghouse Exhaust Gas Temperature	27-TT-172	Thermocouple	0 - 400° F	± 1.0% of span	180 days	6.4.7

ATTACHMENT 14

Demilitarization Miscellaneous Treatment Units

Table of Contents

List of Tables

List of Acronyms

ACAMS	Automatic Continuous Air Monitoring System
ACS	Agent Collection System
AQS	Agent Quantification System
BDS	Bulk Drain Station
BRS	Burster Removal Station
BSRM	Burster Size Reduction Machine
CCTV	Closed Circuit Television
CHB	Container Handling Building
CON	Control Room
CSS	Conditioning and Settling System
CWC	Chemical Weapons Convention
DCD	Deseret Chemical Depot
DFS	Deactivation Furnace System
DS	Discharge/Output Station
DSHW	Division of Solid and Hazardous Waste
ECR	Explosive Containment Room
ECV	Explosive Containment Room Vestibule
FCC	Facility Construction Certification
HCl	Hydrochloric Acid
HVAC	Heating, Ventilation, and Air Conditioning System
IS	Infeed/Transfer Station
LIC	Liquid Incinerator
MDB	Munitions Demilitarization Building
MDM	Multipurpose Demilitarization Machine
MPB	Munitions Processing Bay
MPF	Metal Parts Furnace
MPRS	Miscellaneous Parts Removal Station
NAAQS	National Ambient Air Quality Standards
NCRS	Nose Closure Removal Station
NO_x	Nitrogen Oxides
O_3	Ozone
ONC	Onsite Container
PHS	Projectile/Mortar Handling System
PLC	Programmable Logic Controller
PM_{10}	Particles Less Than 10 Microns in Aerodynamic Diameter
PMD	Projectile/Mortar Disassembly Machine
PPM	Pick and Place Machine
RCRA	Resource Conservation and Recovery Act
RDS	Rocket Drain Station
RSM	Rocket Shear Machine
RSS	Rocket Shear Station
SDS	Spent Decontamination System
SO_2	Sulfur Dioxide
TOCDF	Tooele Chemical Agent Disposal Facility
TSP	Total Suspended Particles
UPA	Unpack Area

14.1 Description of Miscellaneous Units

14.1.1 The miscellaneous units addressed in this attachment are:

14.1.1.1 Rocket Shear Machine (RSM), including the Rocket Drain Station (RDS) and the Rocket Shear Station (RSS)
14.1.1.2 Bulk Drain Station (BDS)
14.1.1.3 Projectile/Mortar Disassembly Machine (PMD), including the Multi-position Loader.
14.1.1.4 Multipurpose Demilitarization Machine (MDM), including the Pick and Place Machine.
14.1.1.5 Mine Machine.
14.1.1.6 Air Operated Remote Ordnance Access System (Cutter Machine)

14.1.2 These units do not fit the definition of a container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, or underground injection well. Therefore, these units are categorized as miscellaneous units. The miscellaneous treatment units listed above will be used to treat the following items:

14.1.2.1M55 rockets (RSM)
14.1.2.2Explosive components from munitions (RSM)
14.1.2.3MK-116 Weteye bombs (BDS)
14.1.2.4TMU-28/B spray tanks (BDS)
14.1.2.5Ton containers (BDS)
14.1.2.6M360 projectiles, 105mm (PMD and MDM)
14.1.2.7M104, M110, M121, M121A1, and M122 projectiles, 155mm (PMD and MDM)
14.1.2.8M2 and M2A1 mortar cartridges, 4.2-inch (PMD and MDM).
14.1.2.9M23 mines (Mine Machine)

14.1.3 The treatment objectives for the RSM are to: (1) separate the liquid agent from the rocket, sending the agent to the Agent Collection System (ACS) and (2) shear the rocket into eight pieces for further treatment in the Deactivation Furnace System (DFS).

14.1.4 The treatment objective for the BDS is to separate the liquid agent from its container and send the agent to the ACS and the bulk item casing containing a solid and liquid residue heel to the Metal Parts Furnace (MPF) for further treatment.

14.1.5 The treatment objective for the PMD is to separate, as applicable, explosive and miscellaneous components and bursters from the munitions and send the burster to the RSM for further treatment. All miscellaneous and explosive components and sheared bursters are sent to the DFS for further treatment.

14.1.6 The treatment objective for the MDM is to separate the liquid agent from the munition and send the agent to the ACS and the casing to the MPF for further treatment.

14.1.7 The treatment objective for the Mine Machine is to separate the agent from the mine and transfer the mine and explosive components to the DFS for further treatment.

14.1.8 The treatment objective for the Cutter Machine is to gain access to the interior components of overpacked/reject munitions or other cylindrical items so that the liquid agent can be sent to the ACS or SDS for further processing, and the metal components to the MPF or DFS (if energetically configured) for further treatment.

14.2 ROCKET SHEAR MACHINE

14.2.1 Physical Characteristics

14.2.1.1 The rocket handling system, of which the RSM is a part, is designed to prepare the GB and VX M55 rockets for demilitarization. The rocket handling system transports the rockets from the Munitions Demilitarization Building (MDB) Unpack Area (UPA), through the Explosive Containment Vestibule (ECV), to the Explosive Containment Rooms (ECRs) where the chemical agent from the rocket is drained and the rocket is then sheared into pieces that can be safely processed through the DFS. The chemical agent drained from the rocket is collected by the ACS, a separate system that includes the Agent Quantification System (AQS) and the agent holding tanks, as well as associated pumps, valves, piping, and other ancillary equipment. It is then incinerated in the Liquid Incinerators (LICs).

14.2.1.2 The rocket handling system consists of two identical process lines designed to operate simultaneously. Both rocket-processing lines (A and B) are located on the second floor of the MDB. Each line consists of a rocket metering input assembly, two input conveyors, and an RSM.

14.2.1.3 The rocket input metering system, Input Conveyor 1, and the airlock assembly are located in the MDB UPA. Input Conveyor 2 is located in the ECV; it separates the UPA from the ECRs. The RSMs, which actually drain and shear the rockets, are located in the ECRs.

14.2.1.4 The rocket metering assembly and the input conveyors are not considered part of the RSMs but are part of the material handling equipment system. However, the rocket metering assembly and input conveyors will be discussed in this attachment since their operation has a direct impact on the operation and maintenance of the RSM.

14.2.1.5 Equipment Installation

14.2.1.5.1 The equipment that constitutes the rocket handling system has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the rocket handling system equipment has been installed in accordance with the equipment’s design specifications and drawings.

14.2.1.6 Dimensions and Location

14.2.1.6.1 The approximate size of the RSM is 19 feet long by four feet wide by seven feet high. Most of the machine components are nickel-plated, and others are coated with a corrosion-resistant epoxy paint to protect against the corrosive action of the decontamination solutions used at the facility. The RSM's approximate dead weight is 3,500 pounds.

14.2.1.6.2 The RSMs for rocket processing lines A and B are located in ECRs A and B, respectively, on the second floor of the MDB. To provide effective containment in the event of any spills, leaks, or explosions, the ECRs have been equipped with blast doors and blast gates that remain closed while punching, draining, and shearing operations are taking place. Furthermore, each ECR is provided with a containment sump, and the air from the rooms is cycled through a ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, each ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene. To ensure that this design limit is not exceeded, no more than two rockets (one to be drained and the other to be sheared) are allowed inside each ECR at any given time.

14.2.1.7 Conveyors

14.2.1.7.1 The rocket input metering system, Input Conveyor 1, and airlock assembly are located in the MDB UPA. Input Conveyor 2 is in the ECV. The ECV separates the UPA from the ECRs.

14.2.1.7.2 The rocket metering assembly and the input conveyors are not considered to be part of the RSM; instead, they are considered part of the material handling equipment system.

14.2.1.8 Gates

14.2.1.8.1 The rockets are transferred either automatically or by remote manual control from the ECV into the ECRs through one of two ECR blast gates. These gates open to receive a rocket and will not close until a rocket is transferred completely into the ECR.

14.2.1.9 Pumps and Transfer Lines

14.2.1.9.1 The RSMs are equipped with pumps to remove chemical agent from the rockets. The drained chemical agent is transferred from the RSM through lines connecting the pumps to the ACS.

14.2.1.10 Sump Pump

14.2.1.10.1 Each of the two ECRs is provided with a containment sump. Each sump is serviced by a sump pump located in the Munitions Corridor. Sump pump operation is controlled by a local-off-remote switch and must be designated by the toxic area entrant for either local (local manual) or remote (level-controlled) operation. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.2.1.11 Tanks and Containers

14.2.1.11.1 There are no tanks or containers directly associated with the RSMs. Agent from the RDS is pumped directly to the AQS, which is part of the ACS.

14.2.1.12 Feed System

14.2.1.12.1 The rocket metering input assembly consists of a feed table, a rotating drum, and a reject table. The rocket metering input assembly receives the rocket to be demilitarized, verifies the orientation of the rocket (all rockets must be fed to the rocket processing line with their fuse end first), and feeds the rocket to the Input Conveyor 1 and airlock assembly. Operators in the UPA manually load the rockets in their shipping and firing tubes (fuse end first) into the rocket metering input assembly. This assembly feeds the rockets, correctly oriented, one at a time, to the rocket processing line. Exit from the rotating drum is via a simple flapper gate that is normally kept closed.

14.2.1.12.2 When the rocket metering input assembly is being operated remotely by the Programmable Logic Controller (PLC) and the CON, the PLC coordinates the movement of the rotating drum with the operations of the rocket input conveyors and the RSM. The rocket metering input assembly's rotating drum loads rockets onto Rocket Input Conveyor 1 only if rockets are not present on either Rocket Input Conveyor 1 or 2.

14.2.1.13 Input Conveyor 1 and Airlock Assembly

14.2.1.13.1 The Input Conveyor 1 and airlock assembly separate the UPA from the ECV. The conveyor receives the rockets as they roll out of the rocket metering input assembly's rotating drum and moves the rockets forward to Input Conveyor 2, located in the ECV. The conveyor is provided with a retro-reflective infrared sensor to detect the presence of a rocket on the conveyor.

14.2.1.14 Input Conveyor 2

14.2.1.14.1 Input Conveyor 2, located in the ECV, transfers the rockets from Input Conveyor 1 to the ECR blast gate that separates the ECV from the ECR. When the RSM is ready to receive the next rocket and the blast gate opens, Input Conveyor 2 pushes the rockets through the blast gate into the ECR. The ECV isolates the ECR from the UPA, and the purpose of Input Conveyor 2 is to transport the rockets between these areas.

14.2.1.14.2 A stop on the conveyor coordinates the movement of the rocket with the opening of the blast gate. A position sensor determines when the rocket has arrived at the stop. The stop consists of a steel plate located between the rollers near the discharge end of the conveyor. The plate is raised to stop the rockets until the munition access gate opens to indicate that the RSM is ready to receive the next rocket. After the blast gate opens, the stop is lowered, which then allows the rocket to pass through the blast gate to the RSM.

14.2.1.15 Instrumentation

14.2.1.15.1 The RSMs are operated by PLCs. The PLCs interface with the controls and instruments for the RSMs. All the instrumentation installed on the machines is designed to relay information to the PLC, and does not offer any local operator control.

14.2.1.15.2 There are a variety of sensors installed to support the operation of the RSMs. The sensors are used to track process flow through the machines and to continually update the PLC with new information. The sensors also indicate cylinder or actuator position. These sensors are listed in Table 14-2-1[1] by switch number, sensor type, and a brief functional description.

14.2.1.16 Electrical System

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1 All tables are located at the end of this Attachment.

14.2.1.16.1 The electrical power supply and distribution network for the process systems are provided by the local utility and by the installation. Electrical power has been extended to the MDB complex as part of the site development. Additionally, there are two backup power systems: essential and uninterruptible. Attachment 9 (Contingency Plan) provides detailed information regarding the backup power systems.

14.2.1.17 Heating, Ventilation, and Air Conditioning System (HVAC)

14.2.1.17.1 The HVAC system for the MDB consists of a once-through cascade system servicing the MDB process areas, a stand-alone HVAC system servicing the MDB CON, and miscellaneous HVAC systems servicing the Category D areas. The primary means of preventing the release or spread of contamination is through the use of cascaded pressure control. The CON is maintained at a positive pressure with respect to the atmosphere, while toxic areas are maintained at a negative pressure with respect to the atmosphere. This ensures a flow of air from the cleanest areas to areas with ascending potential for higher contamination.

14.2.1.17.2 Each room in the MDB has a designated category rating of A, A/B, B, C, D, or E based upon the potential for agent contamination. Rooms assigned a Category A rating (negative pressure), like the ECRs, are routinely contaminated by either agent liquid or vapor. Rooms with a Category B rating (negative pressure) have a high probability of agent vapor contamination resulting from routine operations. Rooms with a Category C rating (negative pressure) have a low probability of agent vapor contamination. Rooms with a Category D rating (atmospheric pressure) have a very remote probability of ever being contaminated by agent. Rooms with a Category E rating (positive pressure) are maintained from being contaminated by agent at all times.

14.2.1.17.3 The control of pressure for the incinerator rooms is accomplished by the control system. The pressure for the other rooms is balanced manually before facility start. The airflow and pressure differentials are regulated manually by fixed balancing dampers to maintain the desired negative environment in the MDB. Isolation dampers are located between Category A, A/B, or B rooms and Category C rooms to prevent possible migration of chemical agent to a lower contamination category area in case of an agent spill and a power failure. These isolation dampers are designed to fail closed.

14.2.1.17.4 Three air handling units supply air to all Category A, A/B, B, and C rooms in the MDB. During normal processing, two air-handling units are online, with the third air-handling unit serving as a spare. Conditioned air is supplied to the air supply-handling units. The filters on the inlet of the air-handling unit are used to remove dust contained in the air. The units have heating coils that are supplied by hot water for use in the winter and cooling coils supplied by chilled water for use in the summer. Outside air flowing across the coils is either heated or cooled. A blower on the unit is used to pull air from outside and deliver the air to the building rooms.

14.2.1.17.5 Air removed from the MPB is exhausted to air filtration units. The MPB is maintained at a negative pressure of approximately 1.8 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.2.1.17.6 Air removed from the ECRs is exhausted to air filtration units. The ECRs are maintained at a negative pressure of approximately 2.0 inches of water column. The exhaust air filtration units contain filter media (carbon adsorption units) used to ensure that agent is not released to the environment.

14.2.1.17.7 Each exhaust filtration unit has ACAMS ports to detect agent breakthrough and send an alarm to the CON for the current agent campaign. The ACAMS sample as described in Attachment 22 (Agent Monitoring Plan).

14.2.1.17.8 Each exhaust filter unit is provided with a centrifugal fan that discharges the air to the atmosphere through an exhaust stack. Air flows through each exhaust filtration unit with a range of 12,200 to 16,000 cubic feet per minute. Air exhausted through the stack is monitored for the presence of GB and VX chemical agent.

14.2.1.18 Fire Protection System

14.2.1.18.1 The fire detection system in the ECRs consists of thermal (heat) detectors, fire dampers, and a fire water system. There are four thermal (heat) detectors mounted on the ceiling of each ECR. The detectors will alarm the CON if extreme heat is detected. In the event that a fire is visually noted, there are two manual pull fire alarms in each ECR that can be used to signal locally at the CON. Since explosives are processed in the ECR, each ECR is also equipped with a deluge system that has three ultraviolet flame detectors and three spray nozzles that are connected to a 2-inch fire water line. Fire dampers are provided in ducts passing through fire-rated walls and ducts serving the MDB. The fire dampers are required to restrict fire propagation in the MDB through the HVAC ducts.

14.2.1.19 Alarm and Communication Systems

14.2.1.19.1 The MDB is equipped with telephones for TOCDF-wide communication. Personnel will be able to use this system to summon assistance in an emergency. The ECR is equipped with horn speakers and Closed Circuit Television (CCTV) so that the operator in the CON can visually observe the operations in the ECRs and notify facility personnel in the event of an emergency. Fire alarms, initiated by the automatic heat detection system or the manual pull stations, are described above. Also, instrumentation alarms will send signals to the CON.

14.2.2 Operations and Maintenance

14.2.2.1 There are two systems that process rockets prior to incineration. These systems operate in parallel, each in its own ECR. This description covers the operation of one rocket system. Operation of the second rocket system is identical. Either line is capable of meeting the maximum feed rate of the DFS, and the two lines are coordinated with each other. Pallets containing leaking rockets are handled similarly to pallets without leakers, except that for sealed[2] ONCs determined, via Automatic Continuous Air Monitoring System (ACAMS) monitoring, to have agent levels greater than 40 TWA, munition unpacking occurs in the TMA. The process description for leaking rockets can be found in Attachment 9 (Contingency Plan).

[2]The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

14.2.2.2 General System Operation

14.2.2.2.1 The RSM is located in the ECR and is comprised of two major workstations: the RDS and the RSS. The rockets are punched and the chemical agent is drained at the RDS for incineration in the LIC, and the drained rockets are sheared into pieces at the RSS and are then incinerated in the DFS.

14.2.2.2.2 The RDS consists of an input conveyor, a rotator, upper and lower clamps, a vent punch, front and rear drain punches, a lift table, and a positive stop cylinder. After the ECR rocket access blast gate opens to indicate that the RSM is ready to process the next rocket, the gate's "open" position switch indicates to the RDS to start the hydraulic motor of the RDS input conveyor. A positive stop is normally extended at the conveyor discharge end except to transfer the rocket from the RDS to the RSS. The positive stop cylinder is designed to block the rocket's movement through the conveyor and position it to be punched and drained at the RDS. After the rocket is in position at the drain station, the blast gate closes and the rocket is clamped to initiate the drain cycle.

14.2.2.2.3 The upper clamp cylinders are hydraulically linked and are designed to operate simultaneously. The bottom clamp is designed to maintain a tight contact around the drain holes to ensure maximum suction from the agent feed pump during the draining cycle.

14.2.2.2.4 While the rocket is clamped, the RDS input conveyor is stopped, the vent and punch cylinders are extended, and the rocket is punched. The agent is drained from the rocket into the AQS verification tank for a predetermined time interval (controlled by a drain timer). Once the AQS verifies that the rocket has been drained, the clamp and the positive stop cylinders retract, and the lift table cylinders raise the table. The rotator then rotates the cylinder 90° in the counterclockwise direction (looking at the tail end of the rocket) to minimize the possibility of residual agent dripping out of the rocket while it continues to be processed. The rocket punching operation is coordinated with the ECV/ECR Feed Blast Gate. The gate must be closed to punch the rocket.

14.2.2.2.5 After the rocket has been rotated, the lift table cylinders return the lift table to its original position and the rotator is rotated back to its original home position. If the RSS has signaled that it is ready to receive the rocket, both the RDS input conveyor and the RSS input conveyor are then started and the RDS Positive Stop is retracted in order to move the rocket to the RSS. The RDS input conveyor will continue to run until a new rocket reaches the RDS positive stop cylinder.

14.2.2.2.6 The RSS consists of a feed conveyor, collar index stops, pusher, and a shear cylinder and blade. Once the rocket has been drained and leaves the RDS, the rocket feed conveyor, which is a hydraulically-driven roller conveyor, moves the rocket up to the collar stops at the RSS. Fiber-optic sensors located near the shear blade signal the collar stops to be extended. The feed conveyor then stops, and the pusher in the rocket transport assembly is activated. The pusher is designed to keep the rocket in position against the collar stops while the shear blade cuts the rocket and to move the rocket into position for each successive cut. The collar stops are extended once for the fuse cut and are retracted for all other cuts.

14.2.2.2.7 Each rocket is sheared into eight pieces by the shear blade, which is cooled with water or decontamination solution to prevent the ignition of the rocket propellant by a hot blade. The flow of water or decontamination solution is controlled with a solenoid valve that opens just before the shear blade is extended and closes immediately after the blade is retracted.

14.2.2.2.8 To cut the rocket, an encoder on the pusher counts off the relative position of the rocket based on the pusher's home position. Seven strokes of the shear blade are needed to cut the rocket into eight pieces. The first stroke of the shear cuts off the front end of the rocket, severing the fuse. The first rocket piece to be processed after startup of the rocket processing line is immediately fed to the DFS through the DFS blast gate. The second through fifth sections, are then cut and collected on top of the DFS blast gate before being fed to the incinerator at least 30 seconds later. The sixth and seventh rocket sections are then cut, collected on top of the DFS blast gate, and fed immediately to the incinerator. The eighth piece, which corresponds to the rocket's fin assembly, is then pushed on to the blast gates where it remains until the fuse of the next rocket is cut; then the DFS blast gate and RSM cycles start all over again. As the shear blade cuts each rocket section, the pusher continues to move the rocket forward to position it for the next cut. The sequence for opening and closing the DFS blast gate is controlled by the DFS controller. The shearing operation is coordinated with the opening of the top of the DFS blast gate, and the ECV/ECR feed blast gates.

14.2.2.3 Setup Procedures

14.2.2.3.1 Automatic operation is the preferred mode for the startup, shutdown, and emergency shutdown of the RSMs and is to be used when possible for all operations. When the system is in automatic and remote manual (from the CON) mode, all system interlocks are automatic, causing the system to fail-safe should an abnormal or upset condition occur. Both rocket processing lines A and B have the same startup, shutdown, and emergency shutdown procedures. Before the startup procedures can begin, the operator must ensure the following systems are operable and online: DFS, DFS pollution abatement system (PAS), Decontamination System, Spent Decontamination System (SDS), Process Water System, Cooling Water System, Instrument Air System, Uninterruptible Power Supply System, Plant Air System, Secondary Power System, Primary Power System, Emergency Generator System, MDB HVAC System, ACS, and CON Console Operations.

14.2.2.4 System Startup

14.2.2.4.1 The procedures for RSMs startup are contained in the appropriate RSM system standard operating procedures document. In summary, the systems are started by placing Line A and B RSMs in automatic mode, including the RDS and RSS sequencers, and then pressing the initialization start icon. This is accomplished remotely in the CON. When the CON display system start/stop icon changes from flashing to steady green, the rocket processing lines are ready to accept rockets.

14.2.2.5 Feed

14.2.2.5.1 The rocket is placed on the rocket metering input assembly. If the rocket is correctly oriented, it is then transported to the blast gate leading to the RSM. During that process, appropriate inspection and paperwork are completed to satisfy the various requirements associated with the Army Surety Program, the Chemical Weapons Convention (CWC), and hazardous waste identification and tracking requirements. Waste quantification requirements are met when the agent is drained from the rocket at the RDS and pumped to the AQS. These various activities are recorded either manually, or by the Process Data Acquisition and Recording System (PDARS), and such records will be available in the facility operating record.

14.2.2.6 Interlock Processes

14.2.2.6.1 The RSM is operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the RSMs neither interfere with each other, nor operate in a manner that is unsafe to human life and health or unprotective of the environment. The RSM interlocks are PLS-3 and PLS-6. PLS-3 is described in this section. PLS-6 is described in Paragraph 14.2.2.8.2. In addition, the interlocks remain in place during manual operation. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.2.2.6.2 When a rocket stops just before it enters the ECR, the ECR blast gate opens and the rocket is conveyed into the ECR. An infrared retro-reflector sensor detects the rocket while it is passing through the blast gate. The sensor is interlocked with the blast gate so that the gate remains open until the entire rocket has successfully passed through the blast gate and enters the ECR.

14.2.2.6.3 Once the rocket enters the ECR, it is processed by the RSM RDS. The rocket entering from the blast gate is transferred to the RSM Input Conveyor. The Input Conveyor moves the rocket fully forward until it is stopped by the rocket positive stop, which has been extended into the path of the rocket. As the rocket is stopped by the positive stop, its arrival is also sensed by fiber-optic sensor PLS-3. As PLS-3 is activated by the rocket interrupting the fiber-optic beam, the system is signaled that there has been a good rocket transfer between the ECV and the ECR and that the rocket is positioned for processing at the RDS. This also starts the ECR blast gate closure and rocket clamping, followed by the punch and drain sequence.

14.2.2.7 Rocket Drain Station

14.2.2.7.1 Once the rocket is held firmly in position for processing, the vent and punch sequences starts. The operations of the vent and punch cylinders are sequenced as follows: the rear drain punch extends then retracts, punching the rocket; the vent punch then extends, punches the rocket, but is not retracted; the front drain punch is then extended and retracted; finally, the vent punch is retracted after the front drain punch is retracted. The drain timer starts running when the rear drain punch is retracted. Chemical agent is drained from the rocket to an AQS tank and then pumped to the agent holding tank.

14.2.2.8 Rocket Shear Station

14.2.2.8.1 After the rocket is drained, it proceeds along the feed conveyor and passes through fiber-optic sensor PLS-5, which is located on the feed conveyor rail. The sensor remains blocked until the rocket index ring is stopped at the Index stop. With the rocket fully forward against the stop, the sensor will be unblocked. This unblocked signal indicates that the rocket is fully forward for the first shear cut (fuze). During the RDS to RSS transfer, the ECR blast gate opens to allow the next rocket (if already present on conveyor #2), to proceed to the RDS. The blast gate is verified closed before punching or shearing operations are initiated.

14.2.2.8.2 As the rocket arrives at the end of the feed conveyor, it is sensed by the Shear Position Switch. When PLS-6 senses the rocket, it is interlocked with the ECR blast door so that the door will remain shut during the shearing operation. The feed conveyor then stops, and the rocket is sheared into eight pieces as previously described.

14.2.2.8.3 The rocket shearing sequence can only continue if the interlocks concerning “hazardous operations” are satisfied. This sequence precludes any hazardous operations, such as rocket shearing or punch operations, from taking place while the DFS gate, ECR blast door, or ECR blast gate is open. These hazardous operations are interrupted until these gates and door are closed. The DFS gate and ECR blast gate are also interlocked to prevent them from being open at the same time.

14.2.2.9 System Shutdown (Normal)

14.2.2.9.1 The rocket processing lines must be clear of rockets prior to system shutdown. The shutdown procedures for the RSM systems are contained in the appropriate RSM standard operating procedure document. In summary, the RSMs are shutdown after first ensuring that no rockets are being fed to the machines, the machines are clear of rockets, and there are no rockets in the blast gates (observed remotely using the CCTV). The system is remotely stopped by the CON operators. After this sequence is completed, the system is “parked”.

14.2.2.10 Emergency Shutdown

14.2.2.10.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition is defined as any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.2.2.11 Extended Shutdown

14.2.2.11.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation, or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the RSM systems have been parked. Some of the extended shutdown procedures are implemented during agent campaign changeover. Extended shutdown procedures include ensuring that agent drain valves are closed and may include installing a spectacle blind flange in the agent line downstream of the ACS pump.

14.2.2.12 Maintenance

14.2.2.12.1 To ensure that the RSM system is in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the RSM will be systematically subjected to preventive maintenance inspections.

14.2.3 Monitoring Procedures

14.2.3.1 Each RSM is equipped with several types of sensors, as shown in Table 14-2-1, to detect the presence and position of cylinders or actuators during operation as explained previously. These sensors ensure that the rockets will be processed safely by relaying information to the PLC.

14.2.3.2 The CON operators monitor the operations of the RSM through the demilitarization operator consoles and CCTVs. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provide operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into logbooks.

14.2.3.3 Chemical agent released in the ECRs will be contained by the sumps or controlled by the HVAC system. ACAMSs are used to monitor for the presence of agent in the ECRs and the ECV as described in Attachment 22 (Agent Monitoring Plan). A multi-agent monitoring plan shall be approved by the Executive Secretary before processing multiple agents.

14.2.3.4 Fire monitoring is described in Section 14.2.1.18, “Fire Protection”.

14.2.3.5 Waste Identification

14.2.3.5.1 By the time a rocket reaches the RSM, it will have been fully identified in accordance with Attachment 2 (Waste Analysis Plan).

14.2.3.6 Waste Throughput

14.2.3.6.1 The waste entering the RSMs is the complete rocket, to include the shipping and firing tube. The chemical agent is separated from the rocket and handled through the ACS. The rocket is sheared into pieces and delivered directly to the DFS for thermal treatment. In each case, quantification of the waste occurs: the agent is quantified in the AQS, and the rockets are quantified by the PDARS and by the manual record created by the CON operator who observes the RSM in operation. Any liquid agent that escapes during the draining process or the shearing process is decontaminated with decontamination solution. The spent decontamination solution goes down the DFS feed chute or is collected in the ECR sump and pumped to the SDS and will be eventually thermally treated in the LIC. Any liquid collected in the ECR sumps is emptied at least daily.

14.2.4 Inspection

14.2.4.1 A TOCDF Inspection Plan is contained in Attachment 5 (Inspection Plan) of this Permit and describes inspection requirements.

14.2.4.2 The RSM, BDS, PMD, MDM, and Mine Machine inspections prevent equipment deterioration and possible equipment malfunctions that would cause abnormal or upset conditions. The inspections are designed to reduce the potential impacts of operations on human health and the environment. In addition to daily inspections, the RSM, BDS, PMD, MDM, and Mine Machine will be monitored remotely by CCTV throughout operations.

14.2.5 Closure

14.2.5.1 Partial Closure

14.2.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the ECRs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; and maintenance and repair will be performed on the machines and other room components as necessary. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from the Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.2.5.2 Final Closure

14.2.5.2.1 Closure of the site is addressed in Attachment 10 (Closure Plan).

14.2.6 Mitigative Design and Operating Standards

14.2.6.1 The ECR is a room where explosives or propellants could potentially be ignited. The design and operating plans for the ECR have been carefully prepared to anticipate this type of mishap. For example, as a worst-case situation, the operating plan limits the total amount of explosives or propellants that are present in the room at any one time so that in the event of an accidental ignition, the ECR could contain the reaction.

14.2.6.2 Protective systems in the ECR include an industrial-type, automatically activated fire sprinkler system. Also, water and decontamination solution outlets are available within the room for manual washdown and area cleanup. The floor of the room is sloped to a sump, and the sump dewatering system transfers the collected liquid to the SDS for disposal in one of the two LICs. Alternatively, the GB sodium hydroxide based spent decontamination solution may be shipped off site for treatment if the requirements of Attachment 2 (Waste Analysis Plan) have been met. Protective clothing is mandatory during cleanup of spilled explosives and propellants in the room, and care is taken to reduce the potential for spills.

14.2.6.3 If an explosion occurs in a containment room, it is expected that a portion of the agent will be combusted while the remainder will exist in a vapor or liquid form. In the ECR, the agent vapors will be contained in the room because both the blast valves and the leak-tight dampers will be closed. The blast valves will remain closed until the pressure decays to the point where the spring force is greater than the room pressure (0.5 pounds per square inch). At this pressure, the blast valve will open, but the leak-tight damper will continue to contain the gases. The leak-tight dampers will not be opened until the room gas pressure has decayed to approximately atmospheric pressure.

14.2.6.4 The ECR is completely surrounded by rooms that are ventilated to the carbon filter system. Therefore, any leakage out of the ECR as a result of a blast will be vented to the filter system.

14.2.6.5 Liquid agent in the ECR resulting from an explosion will be collected in the ECR sump. Because of the limited number of munitions that will be in the ECR at any one time, the amount of liquid agent released by an explosion is not expected to be greater than about two gallons. Once ventilation has been reestablished in the ECR (by reopening the gas-tight valves), DPE entries will be made, and the area will be cleaned with decontamination solution.

14.2.6.6 If DPE entry to the ECR is required after processing rockets and propellant, or if explosives may be present, the DPE Team shall thoroughly wet each other's DPE and the ECR floor (where they will be working) immediately prior to entering the ECR, to preclude the possibility of static discharge. A water hose is available at the decontamination station by the access door to each ECR.

14.2.7 <u>Environmental Performance Standards for Miscellaneous Units</u>

14.2.7.1 The RSM has been designed, installed, and is operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.2.7.2 describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.2.7.2 <u>Miscellaneous Unit Wastes</u>

14.2.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the RSM include M55 rockets and their fiberglass shipping tubes. These wastes have been identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.2.7.2.2 The maximum volume of wastes that will be processed at the RSM at one time is two rockets. The RDS can process one rocket while the RSS is processing the other rocket. All components of a rocket, including its shipping tubes are to be incinerated in the DFS (except for the drained chemical agent, which is pumped to the ACS and incinerated in the LICs).

14.2.7.3 <u>Containment System</u>

14.2.7.3.1 There is an RSM and PMD located in each of the two ECRs in the MDB. The containment system for each ECR is further described in Table 4 of this Permit. Each room contains curbs, walls, ceiling, and a sump. The floor is coated with an agent-resistant coating and sloped toward a sump. The walls, curbs, and ceiling are also coated with agent-resistant coating. The sumps located in each of the ECRs are primary containment sumps, and are identical. Each has a trench and dimensions of approximately 2.75 by 2.75 by 2.38 feet, with a capacity of about 89 gallons. The volume of the sump is more than sufficient to contain any chemical agent spill in the ECR.

14.2.7.3.2 The sumps are constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The external liner for each sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The concrete is designed to be free from cracks or gaps.

14.2.7.3.3 Each sump metal internal liner is equipped with a level sensor probe to detect liquid. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner will be sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for detection within 24 hours of occurrence.

14.2.7.3.4 The two ECRs are inside the MDB and are thus protected from climatic conditions and precipitation so no overflow of the containment system due to runon will occur.

14.2.7.4 <u>Site Air Conditions</u>

14.2.7.4.1 The following paragraphs describe the potential impacts of air emissions due to operation of the RSMs, BDSs, PMDs, MDMs, and the Mine Machine. A brief description of topographic and meteorologic characteristics of the Tooele area are presented as well as a summary of potential impacts on existing air quality in the Tooele region.

14.2.7.5 <u>Topography</u>

14.2.7.5.1 The DCD is located in Tooele County in the northwest portion of the State of Utah. The DCD spreads out over 19,364 acres in the middle of Rush Valley. Attachment 1 (Facility Description) provides detailed information regarding topography.

14.2.7.6 <u>Meteorologic and Atmospheric Conditions</u>

14.2.7.6.1 The climate around TOCDF is characteristic of semi-arid continental regions. Attachment 1 (Facility Description) provides additional information regarding meterologic and atmospheric conditions.

14.2.7.7 <u>Air Quality</u>

14.2.7.7.1 The TOCDF is located south of the Great Salt Lake Air Basin in the area designated by the EPA as the Wasatch Front Intrastate Air Quality Control Region [Title 40, Code of Federal Regulations (CFR) Part 81.52]. This region has been designated by the EPA as meeting all regulated pollutant National Ambient Air Quality Standards (NAAQS).

14.2.7.7.2 Historically, ambient monitoring at DCD has been conducted for sulfur dioxide (SO_2), nitrogen oxides (NO_x), ozone (O_3), total suspended particulates (TSP), and particulates less than 10 microns in aerodynamic diameter (PM_{10}). No exceedances of existing state and Federal NAAQS have been observed at DCD. The DCD also has a network of agent monitors around the TOCDF.

14.2.7.7.3 Any air emissions from the demilitarization machines located in the ECRs or MPB are captured by the MDB ventilation system and processed through the MDB carbon filter system before being exhausted to the HVAC stack.

14.2.7.8 Prevention of Air Emissions

14.2.7.8.1 The RSMs, BDSs, PMDs, MDMs/PPMs, and Mine Machine are not sources of air emissions in and of themselves, but they are associated with treatment operations that could potentially emit air pollutants. For example, the RSM, Mine Machine, BDS, or MDM agent draining process could potentially release small quantities of agent due to evaporation. For the purposes of analyzing potential air emissions from these machines, it is assumed that the machines and ancillary equipment associated with the machines (e.g., piping and sumps), are the sources of pollutants. These air emissions will occur as part of normal TOCDF operations.

14.2.7.8.2 When the munitions are brought to the ECRs or the MPB, the munitions have already been identified, so the type of propellant, explosive, miscellaneous materials, and agent being drained from the munitions and bulk items is known. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan), and are not reproduced here.

14.2.7.8.3 Potential sources of air emissions from the RSMs, BDSs, PMDs, MDMs, and Mine Machine include agent, decontamination solution, and possibly metal particulates (from the shearing and cutting processes). Emissions of agent are predicted to occur due to vaporization.

14.2.7.8.4 Emissions of decontamination solution, which is a water-based cleaning solution, are predicted to result from evaporative processes. However, the vapor pressure of this solution (containing mostly water) at the conditions within the ECR or MPB is low; therefore, evaporative emissions are expected to be negligible.

14.2.7.8.5 Emissions of metal particulates in the ECRs are also expected to be negligible since the RSM shear blade and rocket are coated with the water/decontamination solution during the cutting process. Emissions of metal particulates in the MPB are also expected to be negligible because the bulk munitions are penetrated with a metal punch and no fragmenting is anticipated.

14.2.7.9 Operating Standards

14.2.7.9.1 Based on the above, agent is assumed to be the pollutant of concern from the RSM with respect to air emissions. The MDB carbon filter system is monitored for the presence of agent and the carbon beds will be replaced before breakthrough of all the cascading beds is possible.

14.2.7.9.2 Agent emissions from the RSM will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to the 120-foot HVAC stack.

14.2.7.9.3 The RSMs are located in the ECRs within the MDB. The ECRs are maintained at a pressure of approximately -2 inches of water column. These two rooms are maintained at the lowest pressures within the MDB so all air emissions from the RSM during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.2.7.9.4 Attachment 5 (Inspection Plan) addresses inspection and monitoring of the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, some operation procedures have been implemented to minimize the potential for air emissions while operating the RSMs:

14.2.7.9.4.1 Munitions will be drained of agent as soon as they are punched, thus reducing the likelihood of evaporation (agent will be collected by the ACS and contained in AQS tanks near the RSM).

14.2.7.9.4.2 Rocket processing on the RSM includes an automatic procedure to rotate the rocket 90° (longitudinally), after being drained, to minimize residual agent spills.

14.2.7.9.4.3 Sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect agent, and to determine loss of blower performance.

14.2.7.10 Site Hydrologic Conditions

14.2.7.10.1 A summary of site hydrologic conditions is given in Attachment 1 (Facility Description).

14.2.7.10.2 Solid and liquid releases of agent and other material from operation of the RSM or Mine Machine are fully contained within the ECRs. These releases, if any, will not impact soil, groundwater, or surface water, or degrade the existing quality of these media. Therefore, no adverse affects on these media are anticipated from operation of the rocket or mine handling system. Additionally, no adverse impacts on vegetation, current land use patterns, or human health are expected.

14.2.7.11 Migration of Waste Constituents

14.2.7.11.1 Migration of munition or bulk item wastes into the environment from RSM, BDS, PMD, MDM, or Mine Machine operations is not expected to occur. Therefore, no impacts on human health and the environment from the RSMs, BDSs, PMDs, MDMs, or Mine Machine are expected.

14.3. BULK DRAIN STATION

14.3.1 Physical Characteristics

14.3.1.1 The TOCDF bulk item processing system, which includes two BDSs, is designed to safely remove liquid agent from items such as bombs, ton containers, and spray tanks. Following removal of the liquid agent, the munition casing or container is sent to the MPF for further treatment. The chemical agent is collected by the ACS, a separate system that includes the agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The drained agent is then incinerated in the LICs.

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14.3.1.2 The BDS processes munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition or bulk item. The BDSs are designed to punch a hole in munitions or bulk items and drain the liquid chemical agent from them. The following munitions and bulk items are processed on the BDS:

14.3.1.2.1 MK-116 Weteye bombs
14.3.1.2.2 TMU-28/B spray tanks
14.3.1.2.3 Ton containers.

14.3.1.3 The BDS begins at the munitions demilitarization gates, where the munitions are transferred from the Upper Munitions Corridor into the MPB onto the BDS Indexing Hydraulic Conveyor. It ends where the BDS Hydraulic Conveyor transfers the bulk item to a series of three MDM Indexing Hydraulic Conveyor that leads through two other indexing conveyors to the Lift Car Assembly at the far end of the MPB. Eventually, the bulk items are transferred to the MPF for thermal treatment.

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14.3.1.4 Equipment Installation

14.3.1.4.1 The equipment that constitutes the bulk item processing system has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the bulk item processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the permit.

14.3.1.5 Dimensions and Location

14.3.1.5.1 Each BDS is approximately 17 feet long, eight feet wide, and 10 feet high. The approximate nominal weight of each BDS is 16,500 pounds. The conveyors, which are an integral part of each BDS, are 17 feet long, five feet wide, and three feet high. They weigh approximately 3,000 pounds each. The BDSs are located on the second floor of the MDB in the MPB.

14.3.1.6 Conveyors

14.3.1.6.1 The BDS consists of a Munitions Transfer Conveyor, Main Frame Assembly, and a Punch and Drain Station. The munitions and bulk items are transferred to the BDS in specially designed cradles that are mounted on MPF trays.

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14.3.1.7 Gates

14.3.1.7.1 The cradles/trays are transferred automatically from the MDM Feed Conveyor in the Upper Munitions Corridor into the MPB through one of two MPB gates. The gates are opened to receive bulk items and they will not close until the bulk item is transferred completely into the MPB (see Section 14.3.2.9 on interlocks).

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14.3.1.8 Pump and Transfer Lines

14.3.1.8.1 Each BDS's ACS is equipped with pumps to remove agent from the munitions and bulk items. The agent is transferred from the BDS through lines connecting the pumps to the ACS and to the agent holding tanks.

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14.3.1.9 Tanks and Containers

14.3.1.9.1 There are no tanks or containers directly associated with the BDSs. Agent from the BDS is pumped directly to the ACS Tanks.

14.3.1.10 Feed System

14.3.1.10.1 The BDS Main Frame Assembly, which is constructed of steel, supports the conveyors, sensors, hydraulic apparatus, punch, drain tube apparatus, and other ancillary equipment associated with the BDS.

14.3.1.10.2 The munitions and bulk items (including the cradle and tray) are weighed before and after the agent draining process to obtain the initial full weight and final drained weight of the items. A set of load cells, mounted on hydraulic cylinders in the Munitions Transfer Conveyor, are designed to accomplish this.

14.3.1.10.3 The Punch Station consists of a hydraulic cylinder equipped with a punch and hold-down clamp. The hydraulic cylinder is mounted vertically on the upper front of the BDS column assembly, which stands next to the conveyor (toward the center of the MPB) so that the Punch is suspended over the center line of the conveyor. When extended, the cylinder punches a hole through the top of the munition or bulk item. The punch is mounted at the top of the column when processing spray tanks, ton containers, and MK-116 Weteye bombs and lower on the column when processing the other bombs. Two position switches on the cylinder sense the position of the punch (retracted or extended).

14.3.1.10.4 The BDS hold-down clamp is mounted on the hold-down support assembly, below the punch cylinder. It consists of two small hydraulic cylinders, one on each side of the punch, that extend a hold-down clamp near the surface of the bulk item. The hold-down clamp prevents excessive lifting or rolling of the munition or bulk item in place when the punch is retracted. The hold-down clamp cylinders are actuated by hydraulic fluid from the same control valve as the conveyor lift cylinders.

14.3.1.10.5 The Drain Station consists of an agent drain tube that is lowered into the bulk item through the hole made by the punch. The agent drain tube is a stainless steel tube connected by flexible tubing to the ACS piping. A hydraulically driven lead screw is used to raise and lower the agent drain tube. All components are mounted on the same BDS column assembly as the Punch Station. Four position switches next to the drain tube sense the extent of tube travel (retracted and first, second, and third drain positions). The height of the drain tube can be adjusted by clamps that hold it to the lead screw. The amount of agent removed is quantified at the Drain Station by the use of before and after agent drain weights.

14.3.1.10.6 Reserved

14.3.1.10.7 The draining of mustard ton containers is performed using qualitative information gained through the approximate measurement of the solid residue heel that took place prior to TOCDF receipt of the ton containers and quantitatively from historical tare weights and final weights.

14.3.1.11 Instrumentation

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Deleted: BDS-101 can be equipped with two spray nozzle assemblies to process bulk munitions that require special handling. These spray nozzles are inserted into a bulk container that has been punched and drained. The spray nozzles will be used to spray decon solution, weak acid solutions (e.g., 2% HCl), and process water into bulk containers that have heels with high metal concentrations. A drain probe will be lowered through a punched hole in the bulk container for removal of the rinse material.

14.3.1.11.1 Instrumentation associated with the BDSs is remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, load cells, drain verification system, and interlocks. Table 14-3-1[3] summarizes the various sensors for the BDS and their function. Details of the instruments and sensors are shown on drawings contained in Attachment 11 (General Facility Drawings).

14.3.1.12 Electrical System

14.3.1.12.1 See Section 14.2.1.16.

14.3.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.3.1.13.1 See Section 14.2.1.17.

14.3.1.14 Fire Protection System

14.3.1.14.1 The fire protection system in the MPB consists of thermal (heat) detectors and fire dampers. There are 28 thermal (heat) detectors mounted on the ceiling and 10 on the underside of the platform of the MPB. There are five manual pull fire alarms in the MPB.

14.3.1.14.2 As mentioned above, fire dampers are provided in ducts passing through fire-rated walls and ducts serving the MDB. The fire dampers restrict fire propagation in the building through the ventilation air ducts.

14.3.1.15 Alarm and Communication Systems

14.3.1.15.1 The MDB is equipped with telephones for TOCDF-wide communication. Personnel will be able to use this system to summon assistance in an emergency. The MPB is equipped with horn speakers and CCTV so that the CON operator can visually observe the operations in the MPB and notify facility personnel in the event of an emergency. Fire alarms, initiated by the automatic heat detection system or the manual pull stations, are described above. Also, instrumentation alarms will send signals to the CON.

14.3.2 Operations and Maintenance

14.3.2.1 Munitions and bulk items to be processed at the BDS are received from the Upper Munitions Corridor, and transferred to the MPB. As the conveyor moves the bulk item(s) to the correct position under each station, the BDS punches and drains the bulk item. For bulk items previously verified as drained prior to arrival at the BDS, the BDS drain sequence may be bypassed.

14.3.2.2 As mentioned previously, all munitions are received and processed in cradles that are mounted on MPF trays. Ton containers, Weteye bombs, and spray tanks are received one at a time. The following section further describes the operating sequence for munitions and bulk items processing at the BDS.

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[3] All tables are located at the end of this Attachment.

14.3.2.3 The BDS is designed to receive waste feed, in terms of munitions or bulk items, and treat and forward the drained munitions or bulk containers to the MPF. The MPF maximum feed rates are specified in this Permit. Upon reaching the BDS, each munition or bulk item waste will have been identified. Physical and chemical characteristics of each waste are summarized in Attachment 2 (Waste Analysis Plan).

14.3.2.4 Reserved

14.3.2.5 General System Operation

14.3.2.5.1 Reserved

14.3.2.5.2 Operating Description: Ton Container

14.3.2.5.2.1 At the BDS, ton containers are punched, drained of liquid agent, and punched again at least once. The ton containers are moved to the punch position by the indexing hydraulic conveyor. Proximity switches detect flags located on the side of the cradles which position the cradle for punching and draining. When the bulk item is stopped at the punch position, the indexing conveyor lowers allowing the cradle/tray to rest on the main frame anvils. Simultaneously, the hold-down cylinders extend to prevent excessive lifting or rolling of the bulk item. The Punch then extends, creating a hole in the bulk item. When punching is complete, the punch cylinder retracts, the transfer conveyor raises, the hold-down cylinders retract, and the bulk item moves to the drain position. For bulk items previously verified as drained prior to arrival at the BDS, the BDS drain sequence may be bypassed.

14.3.2.5.2.2 Prior to draining (and after punching), the indexing hydraulic conveyor, tray, cradle, and munition/bulk item are raised hydraulically off the anvil and weighed by a set of four Load Cells. These cells are located under each corner of the conveyor and are mounted on the hydraulic cylinders that raise the conveyor. Weighing is accomplished electronically by actuating the Load Cells (conveyor in raised position). The weight is recorded by the PLC.

14.3.2.5.2.3 A drain tube is lowered into the punched hole on the bulk item at the Drain Station. The tube then extends until it reaches an operator-entered depth inside the interior of the bulk item or until the solid is detected.. Draining starts after the bubbler system verifies the presence of liquid chemical agent. The bulk item is drained to ensure all but residual chemical agent and solid residue have been removed. After the drain tube retracts, the bulk item is re-weighed by the Load Cells. By comparing the full and drained weights, the amount of chemical agent removed is obtained. The indexing conveyor then moves the bulk item to the correct position for punching at least once more vent hole, the conveyor and hold-down clamp lower, a vent hole is punched (the same size as the drain hole), and the conveyor and hold-down clamp raise. The bulk item (with cradle/tray) is then transferred to the MDM Indexing Hydraulic Conveyors that deliver the cradle to the opposite end of the MPB.

14.3.2.5.2.4 The spray tanks will be processed with an additional step before being transferred to the MDM Indexing Hydraulic Conveyor. The BDS has been modified by adding a Nose Drill

Deleted: , which receives the items after they are drained.

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Station, so that a hole can be drilled in the nose of the spray tank. This hole will facilitate venting of the internal spray tank nose construction materials when the spray tank is in the MPF.

14.3.2.6 Setup Procedures

14.3.2.6.1 The BDS is initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. The indicators in the CON are observed to verify the status of the BDS. The BDS major system components are turned off, and the initialization procedure is completed. At this point, the BDS is ready to receive a start command from the CON.

14.3.2.7 System Startup

14.3.2.7.1 The procedures for BDS startup are contained in the appropriate BDS system standard operating procedures document. In summary, the systems are started by placing Line A and B BDSs in automatic mode, selecting the type of agent and bulk item to be processed, and then pressing the initialization start icon. This is accomplished remotely in the control room. When the control room display system start/stop icon changes from flashing to steady green, the processing lines are ready to accept bulk items.

14.3.2.8 Feed

14.3.2.8.1 Waste quantification requirements are met when the weighing operation is performed at the BDS. These various activities are recorded either manually, or by the PDARS, and such records will be available at the plant in the facility Operating Record.

14.3.2.9 Interlock Processes

14.3.2.9.1 The BDS is operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the BDS do not interfere with each other or operate in a manner that is unsafe to human life or unprotective of the environment. The interlocks remain in place during manual operations.

14.3.2.9.2 Should the BDS machine malfunction, the demilitarization line will stop until the problem is corrected. The process step being performed by the BDS is displayed on the CON screen so that the operator can determine which process sequence step was not completed. The BDS cannot be started again until the problem is corrected because the system is interlocked (in a fail safe mode). The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.3.2.9.3 There are two interlocks associated with the BDS operations that are activated by sensors P2 and P5 (see Table 14-3-1 for a description of these sensors). When a munition and cradle/tray are being transferred from the Munitions Corridor to the MPB through the munitions demilitarization gates, the gate will remain open and interlocked until the cradle/tray arrives at the BDS Punch Station. Sensor P2 detects the presence of the cradle/tray at the Punch Station and allows the gate to close.

14.3.2.9.4 After a munition has been processed at the BDS, it passes sensor P5, a retroreflectorive sensor, which signals that the cradle/tray is being transferred to the next conveyor. If another munition is waiting in the Munitions Corridor at the munitions demilitarization gates, and no BDS (or MDM) processing is being conducted, the gate(s) will open to allow the next cradle/tray into the MPB.

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14.3.2.10 System Shutdown (Normal)

14.3.2.10.1 After the stop command has been issued, the BDS is "parked." When the BDS is parked, it is configured so that the conveyor lift table, hold-down cylinders, and punch cylinder are extended; this is the fail-safe mode.

14.3.2.10.2 After the bomb and bulk item demilitarization campaigns have been completed, the BDS will no longer be needed except to transfer projectiles and mortars from the Munitions Corridor to the MDMs, which are also located in the MPB.

14.3.2.11 Emergency Shutdown

14.3.2.11.1 In the event of an abnormal or upset condition associated with the BDS, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the BDS. When this command is issued, the BDS machine components are stopped.

14.3.2.12 Extended Shutdown

14.3.2.12.1 The BDS operating procedures do not include specific steps to shut down the system for extended periods. Instead, normal shutdown procedures are followed when the BDS machines are not being used. Shutdown procedures are implemented after the BDS is parked as explained earlier.

14.3.2.13 Maintenance

14.3.2.13.1 Maintenance of the BDS machine includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) for the BDS machine.

14.3.3 Monitoring Procedures

14.3.3.1 Each BDS is equipped with sensors to detect the presence, position, and weight of munitions and bulk items during operations. The sensors, which are connected through PLCs, ensure that the munitions and bulk items will be processed safely by relaying information to the CON.

14.3.3.2 The CON monitors the operations of the BDS through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provide operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into logbooks.

14.3.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMSs are used to detect the presence of agent vapors in the MPB.

14.3.3.4 Waste Identification

14.3.3.4.1 As mentioned previously, waste munitions and bulk items are fully identified prior to entering the BDS. The quantity of munitions and bulk items processed by the BDS is recorded by the PDARS and maintained in a logbook by CON operators.

14.3.3.5 Waste Throughput

14.3.3.5.1 The waste entering the BDS is a bulk item. During treatment by the BDS, the liquid agent is separated from the item and handled through the ACS. The metal casing is then transported away from the BDS for thermal treatment later in the MPF. In each case, quantification of waste occurs: the agent is quantified as a result of weighings that occur before and after the agent drain process, with the weights and their difference recorded on the PDARS and in the manual record; and the metal casing is quantified through the PDARS record and by the manual record created by the CON operator who observes the BDS in operation.

14.3.4 Inspection

14.3.4.1 See Section 14.2.4.

14.3.5 Closure

14.3.5.1 Partial Closure

14.3.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the BDSs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure from Executive Secretary, the next campaign will commence when authorized and when it is appropriate to do so.

14.3.5.2 Final Closure

14.3.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.3.6 Mitigative Design and Operating Standards

14.3.6.1 The BDS machines are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment. However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment.

14.3.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.3.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and not escape to the atmosphere.

14.3.7 Environmental Performance Standards for Miscellaneous Units

14.3.7.1 The BDS has been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.3.7.2 Miscellaneous Unit Wastes

14.3.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the BDS are associated with bombs and bulk item storage containers (such as ton containers). These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.3.7.2.2 The maximum number of bulk items in the MPB at any time is equal to the number of munitions in eight cradles/trays (one cradle/tray per conveyor section). Therefore, up to eight MK-116 Weteye bombs, eight spray tanks, or eight ton containers could be in the MPB at one time.

14.3.7.2.3 The maximum volume of agent processed in the MPB is equivalent to the number of munitions in each cradle/tray at the BDS. For example, only one ton container may be processed at the BDS at a time. Therefore, during ton container processing, the maximum volume of waste at the BDS is equivalent to the agent in the ton container and the ton container itself. The maximum number of munitions and/or bulk items in the MPB that contain agent is equivalent to two cradle/trays (one per processing line). Therefore, up to two MK-116 Weteye bombs, two spray tanks, or two ton containers containing agent could be at the BDS at one time. When bulk containers are processed using special handling procedures, the rinse materials generated from this operation are transferred from the MPB to the CSS and subsequently managed in accordance with Attachment 2 (Waste Analysis Plan).

14.3.7.3 Containment System

14.3.7.3.1 The seven sumps located in the MPB are primary containment sumps. Some of the sumps have trenches that aid in collecting spills. The dimensions of five of the seven sumps are approximately 2.33 by 2.33 by 2.25 feet with a capacity of about 89 gallons each. The dimensions of the two remaining sumps are approximately 2.33 by 2.33 by 1.89 feet with a capacity of about 75 gallons each (a total combined capacity of approximately 623 gallons not including the trench volume). The outer portion of each sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The sumps are constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The concrete is designed to be free from cracks or gaps.

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14.3.7.3.2 Each sump metal internal liner is equipped with a level sensor probe to detect liquid. The level sensor is screwed into a coupling that is welded into the mounting flange of the metal liner. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner is sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for liquid detection within 24 hours of occurrence.

14.3.7.3.3 As mentioned previously, the maximum number of munitions filled with agent in the MPB at any time is:

14.3.7.3.3.1 Two MK-116 Weteye bombs
14.3.7.3.3.2 Two TMU-28/B spray tanks
14.3.7.3.3.3 Two ton containers.

14.3.7.3.4 Additional quantities of the above munitions or bulk items can be in the MPB at any given time; however, the maximum number of agent-containing bulk items is limited to those being processed at the BDSs. The maximum quantity of agent in munitions being processed is associated with the ton containers (two ton containers hold up to approximately 380 gallons of agent). In the event both ton containers leak or both are ruptured and all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.3.7.3.5 Material in the sumps will be removed within 24 hours of detection. The liner will then be decontaminated, as necessary, and rinsed. All rinsing materials will be collected and transferred to the SDS.

14.3.7.3.6 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.3.7.4 Site Air Conditions

14.3.7.4.1 See Section 14.2.7.4.

14.3.7.5 Topography

14.3.7.5.1 See Section 14.2.7.5.

14. 3.7.6 Meteorologic and Atmospheric Conditions

14. 3.7.6.1 See Section 14.2.7.6.

14.3.7.7 Air Quality

14.3.7.7.1 See Section 14.2.7.7.

14.3.7.8 Prevention of Air Emissions

14.3.7.8.1 See Section 14.2.7.8.

14.3.7.9 Operating Standards

14.3.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the BDS operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The BDS itself is operated in a systematic and safe manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.3.7.10 Site Hydrologic Conditions

14.3.7.10.1 See Section 14.2.7.10.

14.3.7.11 Migration of Waste Constituents

14.3.7.11.1 See Section 14.2.7.11.

14.4 PROJECTILE/MORTAR DISASSEMBLY MACHINE

14.4.1 Physical Characteristics

14.4.1.1 The PMD is part of the Projectile/Mortar Handling System (PHS). The PHS is designed to safely separate explosives and miscellaneous parts (fuze well cups, supplementary charges, cardboard spacers) from 105mm and 155mm projectiles, and 4.2-inch mortars. The PHS includes conveyors that transport the projectiles/mortars from the MDB UPA, through the ECV, to the ECRs where the PMDs are used to remove the explosive components from the projectiles/mortars. Next, the explosive and miscellaneous components are fed into the DFS for thermal destruction, and the projectile/mortar bodies are transferred to the MDM for chemical agent removal. After the chemical agent is removed, the projectile/mortar bodies are thermally treated in the MPF. Finally, the drained chemical agent is incinerated in one of the two LICs.

14.4.1.2 The PHS consists of two identical process lines designed to operate simultaneously. Both projectile/mortar processing lines (A and B) are located on the second floor of the MDB.

Each line consists of several conveyors and a PMD. The Projectile Feed Conveyors and Projectile Discharge Conveyors for process lines A and B will be included with the discussion of the PMD. These conveyors are not considered part of the PMD, but they are included because they represent the beginning and end of the PMD treatment process.

14.4.1.3 Equipment Installation

14.4.1.3.1 The equipment that constitutes the PMD-101 has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Permit Condition I.S. This Certification attests that the PMD equipment has been installed in accordance with the equipment's design specifications and drawings, as stated in this Permit.

14.4.1.4 Dimensions and Location

14.4.1.4.1 The approximate size of the PMD is 13 feet long by 11 feet wide by seven feet high. Most of the machine components are nickel-plated, and others are coated with a corrosion resistant epoxy paint to protect against the corrosive action of the decontamination solutions used at the facility.

14.4.1.4.2 The PMDs are located inside ECRs A and B. To provide effective containment in the event of any spills, leaks, or explosions, the ECRs have been equipped with blast doors and blast gates that remain closed while operations are taking place. Furthermore, each ECR is provided with a containment sump, and the air from the rooms is cycled through a closed ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, each ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene. To ensure that this design limit is not exceeded, the number of munitions in the ECR is limited. See Table 14-4-1[4] for the maximum number of munitions allowed into the ECR.

14.4.1.5 Conveyors

14.4.1.5.1 The projectile feed conveyors are made of steel and have dimensions of approximately 4.75 feet long and 1.33 feet wide. The projectile discharge conveyors are also made of steel and have dimensions of approximately 11.13 feet long and 1.33 feet wide.

14.4.1.5.2 For process line A, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR A. For process line B, the projectile feed conveyor and the projectile discharge conveyor are located inside ECR B.

14.4.1.6 Gates

14.4.1.6.1 The projectiles/mortars are transferred automatically from the ECV into ECR A or B through munition access blast gates. After the projectiles/mortars are processed by the PMDs, they are transferred out of ECR A or B through a discharge blast gate. These gates will not close until a projectile/mortar is transferred completely into or out of the ECRs.

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4 All tables are located at the end of this Attachment.

14.4.1.7 Pumps and Transfer Lines

14.4.1.7.1 PMDs do not drain the chemical agent out of the projectiles/mortars, thus there are no pumps or chemical agent transfer lines associated with the PMDs.

14.4.1.8 Sump Pump

14.4.1.8.1 See Section 14.2.1.10.

14.4.1.9 Tanks and Containers

14.4.1.9.1 There are no tanks or containers directly associated with the PMDs as they are being addressed in this Permit. Chemical agent is drained in the MDM and then pumped directly to the ACS.

14.4.1.10 Feed System

14.4.1.10.1 This section covers the feed system of one PHS; operation of the second system is identical. The feed rate of projectiles/mortars to the ECR varies according to the type and the amount of explosive fed to the DFS. One projectile/mortar system is coordinated with the other to ensure that the explosive limit of the DFS is not exceeded.

14.4.1.10.2 After confirmation of correct lot number and quantity of munitions, a signal is given to the UPA operator to load projectiles/mortars onto the UPA Projectile/Mortar Feed Conveyor. When this operation is complete, the operator signals the CON system and CON operator that loading is complete. The CON operator then initiates the start of processing the projectile/mortar.

14.4.1.10.3 The following conditions must be met before commencement of operation:

14.4.1.10.3.1 Feed conveyors are continuously running
14.4.1.10.3.2 Stops on the conveyors are retracted
14.4.1.10.3.3 ECR munition access blast gate is open.

14.4.1.10.4 When these have been confirmed, the orientation of the projectile/mortar is checked. If it is found that the projectile/mortar was loaded backwards, the UPA operator will reload the projectile/mortar in the correct orientation. The projectile/mortar is conveyed onto the feeder in the ECR. The feeder loads the projectile/mortar onto the Index Table, and the table is rotated. At this time a second projectile/mortar, if properly oriented, is loaded onto the conveyor system and is conveyed into the ECR to be loaded onto the Index Table. At this point, the munition access blast gate closes and the first operation of the explosive removal process commences.

14.4.1.11 Instrumentation

14.4.1.11.1 The PMD is operated by PLCs. The PLCs contain the controls and instruments for the PMD but are not a part of the machine. All the instrumentation installed on the machine is designed to relay information to the PLC. Also, the machine can be operated locally by setting the machines in the local mode from the PLC.

14.4.1.11.2 There is a variety of sensors installed to support the operation of the PMDs. The sensors are used to track process flow through the machine and continually update the PLC with new information. Those types of sensors include inductive proximity sensors (used to track munition movement throughout the process and to indicate the switches) and fiber-optic switches. The sensors are used to track movement throughout the process and to indicate cylinder or actuator position. A list of those sensors, their type, and a brief description of their function is provided in Table 14-4-2.

14.4.1.12 Electrical System

14.4.1.12.1 See Section 14.2.1.16.

14.4.1.13 Heating, Ventilation, and Air Conditioning System (HVAC)

14.4.1.13.1 See Section 14.2.1.17.

14.4.1.14 Fire Protection System

14.4.1.14.1 See Section 14.2.1.18.

14.4.1.15 Alarm and Communication Systems

14.4.1.15.1 See Section 14.2.1.19.

14.4.2 Operations and Maintenance

14.4.2.1 There are two systems that process non-leaking projectiles/mortars prior to the incineration. These systems operate in parallel, each in its own ECR. This description covers the operation of one processing system. Operation of the second system is identical. Either line is capable of meeting the maximum feed rate of the DFS, and the two lines are coordinated with each other. Pallets containing leaking projectiles/mortars are handled similarly to pallets without leakers, except that for sealed[5] ONCs determined, via ACAMS monitoring, to have agent levels greater than 40 VSL, munition unpacking occurs in the TMA. The process description for leaking munitions can be found in Attachment 9 (Contingency Plan).

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14.4.2.2 General System Operation

14.4.2.2.1 The PMD is located in the ECR and is comprised of five major work stations: the Infeed/Transfer Station (IS), Nose Closure Removal Station (NCRS), Miscellaneous Parts Removal Station (MPRS), Burster Removal Station (BRS), and Discharge/Output Station (DS).

14.4.2.2.2 The feed of projectiles/mortars to the PMD is described in Section 14.4.1.10, "Feed System." After a projectile/mortar is successfully transferred into the ECR, the projectile feed conveyor transfers the projectile/mortar to the PMD's infeed conveyor for

[5] The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

disassembly. The PMD infeed conveyor then transfers the projectile/mortar to the IS on the PMD Index Table and the table is rotated to the NCRS. The NCRS removes the nose closure or fuze and burster when processing mortars. Then, the Index Table rotates the projectile/mortar to the MPRS where the supplementary charge and miscellaneous parts (if any) are removed. After the operation at the MPRS is completed, the Index Table rotates to the BRS where the burster of the projectile is removed by differential air pressure. The Index Table then rotates again to the DS where the projectile/mortar is removed from the PMD by the projectile discharge conveyor. The projectile/mortar is transported from the PMD to the discharge blast gate and stop. The munition discharge blast gate opens and the stops holding the munition are retracted, allowing the projectile without explosives to transfer out of the ECR and the next projectile/mortar to travel inside the ECR.

14.4.2.2.3 The nose closure or fuze, miscellaneous parts, and the supplementary charge are deposited onto the miscellaneous parts conveyor which transfers them to the DFS feed gate for thermal destruction. The bursters are conveyed to the Burster Size Reduction Machine (BSRM).

14.4.2.2.4 Except as noted below for bursters from 4.2-inch mortars and 105-mm projectiles, it is necessary to shear the bursters into sections due to the amount of explosive material contained in each burster and the fact that the bursters are contained. This allows the burster to burn instead of exploding inside the DFS. For this operation, the RSM is modified to perform as a BSRM. The RSM is adapted to receive each of the various sizes of bursters from the projectiles. Water-cooled shear blades cut the burster into pieces that fall into the DFS feed gates. Since the burster on the 4.2-inch mortar is relatively small in comparison to projectiles, and since it is open at one end, it does not require this reduction operation. Likewise, the 105-mm burster is open at one end and does not require this reduction operation. However, as a precautionary measure, TOCDF will attempt to cut 105-mm projectile bursters.

14.4.2.3 <u>Setup Procedures</u>

14.4.2.3.1 Automatic operation is the preferred mode for the startup, shutdown, and emergency shutdown of the PMDs and is to be used when possible for all operations. When the system is in automatic and remote manual from the Control Room mode, all system interlocks are automatic, causing the system to fail safe should an abnormal or upset condition occur. Both A and B lines have the same startup, shutdown, and emergency shutdown procedures. Before the startup procedures can begin, the operator must ensure the following systems are operable and online: DFS, DFS PAS, Decontamination System, SDS, Process Water System, Cooling Water System, Instrument Air System, Uninterruptible Power Supply System, Plant Air System, Secondary Power System, Primary Power System, Emergency Generator System, MDB HVAC System, ACS, and CON Console Operations.

14.4.2.4 <u>System Startup</u>

14.4.2.4.1 The procedures for PMDs startup are contained in the appropriate PMD system standard operating procedures document. In summary, the systems are started by selecting the type of agent and the type of munition to be processed and placing the PMD stations in automatic mode. This is done remotely by the CON operators. Before operations are commenced, a receiving tray is staged in the Upper Munitions Corridor on the Bypass Conveyor (this is where the munitions are sent after treatment at the PMD). Once these steps are performed, the PMDs are ready to begin treating munitions.

14.4.2.5 Feed

14.4.2.5.1 Prior to the projectiles/mortars arriving at the blast gate (located between the ECV and ECR and leading to the projectile input conveyor), the projectiles/mortars are identified in the storage igloo, placed in an Onsite Container (ONC) along with their pallet, transported to the Container Handling Building (CHB), and moved to the UPA where the ONC is monitored for chemical agent. If chemical agent is detected, via ACAMS monitoring, inside the ONC, at levels less than or equal to 40VSL, the ONC is opened, the pallet is moved out into the UPA and unpacked. For nonburstered projectiles, the nose plug is either: (1) removed manually in the Upper Munitions Corridor after the munitions are loaded onto trays and the trays are transferred to the bypass conveyor and moved to the Upper Munitions Corridor. Trays are delivered to the MPB for further processing through the MDM following nose plug removal; (2) removed at the PMD; (3) removed at the MDM. For burstered projectiles and mortars, the UPA operator loads the projectile/mortar onto the UPA Projectile/Mortar Feed Conveyor. If the projectile/mortar is correctly oriented, it is then transported to the blast gate leading to the PMD. During that process, appropriate inspections and paperwork are completed to satisfy the various requirements associated with the Army Surety Program, the CWC, and hazardous waste identification and tracking requirements. Waste quantification requirements are met when the chemical agent is drained from the projectile/mortar at the MDM and pumped to the AQS. These various activities are recorded either manually, or by the PDARS, and such records will be available for scrutiny in the facility operating record.

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14.4.2.6 Interlock Processes

14.4.2.6.1 The PMDs are operated in either the manual or automatic mode using a system of interlocks. The goal of the various interlocks is to ensure that the procedures executed by the various components of the PMDs neither interfere with each other, nor operate in a manner that is unsafe to human life and health or unprotective of the environment. The interlocks are ZS-139/239, 1-P1, 2-P1, and ZS-147/247. Interlocks ZS-139/239 are described in this section, 1-P1 and 2-P1 are described in Section14.4.2.7, and ZS-147/247 are described in Section 14.4.2.11. The interlocks remain in place during manual operation and also prevent operator error that could result in the machine being operated in an unsafe or unprotective manner. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.4.2.6.2 When a projectile/mortar stops just before it enters the ECR, the munition access blast gate will open and the projectile/mortar will be conveyed into the ECR. An infrared retro-reflector sensor (ZS-139 and ZS-239, for lines A and B, respectively) detects the projectile/mortar while it is passing through the blast gate. The sensor is interlocked with the munition access blast gate so that the gate remains open until the entire projectile/mortar has successfully passed through the munition access blast gate and enters the ECR.

14.4.2.6.3 Once the projectile/mortar enters the ECR, it is processed by the PMD. The projectile/mortar entering from the blast gate is transferred to the projectile feed conveyor. The projectile feed conveyor moves the projectile/mortar to the PMD Infeed/Transfer Station.

14.4.2.7 Infeed/Transfer Station

14.4.2.7.1 A sensor on the infeed conveyor (1-P1 and 2-P1, for lines A and B, respectively) detects the presence of the projectile/mortar. This sensor is interlocked with the munition access blast gate. The munition access blast gate will close when the sensor detects the projectile/mortar on the infeed conveyor. The infeed conveyor moves the projectile/mortar near the saddle on the Index Table. From this position, the Transfer Conveyor Pusher contacts the projectile/mortar and pushes it onto the saddle. The Index Table then rotates clockwise to bring the projectile/mortar to the NCRS.

14.4.2.8 Nose Closure Removal Station (NCRS)

14.4.2.8.1 The NCRS is the number 2 processing station on the PMD. The NCRS is used to remove the nose closure or fuze from projectiles and fuzes and bursters from mortars. When a projectile/mortar is detected in the NCRS by sensor P2, the projectile is clamped. A hydraulic chuck engages and unscrews the components. The components are removed from each type of projectile/mortar as follows:

Projectile/Mortar	Removal Process
105mm	The nose plug or fuze is unscrewed and removed.
155mm	The nose closure is unscrewed and removed.
Mortars	The fuze and burster are unscrewed and removed as one unit since they are screwed together; therefore, the hydraulic chuck is needed to separate the fuze from the burster.

14.4.2.8.2 All components from the NCRS are dropped onto the miscellaneous parts removal station conveyor. After the operation in the NCRS is completed, the station signals to the PLC that it is ready to index. The Index Table is then rotated clockwise to bring the projectile/mortar to the MPRS.

14.4.2.9 Miscellaneous Parts Removal Station (MPRS)

14.4.2.9.1 The MPRS removes the fuze well cup or supplemental charges from the projectiles. Not all projectiles have components that require removal at the MPRS station. Munitions that do not require any disassembly at this station [such as 105mm (M360) and 155mm (M121) projectiles and 4.2-inch (M2A1) mortars] will bypass it. When sensor P3 detects a projectile is present at the MPRS, the projectile hold-down cylinder and positioning cylinder extend. Then, the MPRS carriage moves forward to remove the components from the following types of projectiles:

Projectile	Removal Process
155mm	The screw type fuze well cups from M110 projectiles are removed.
155mm	A magnet on the MPRS is used to remove the supplementary charge from the M121A1 projectiles.

14.4.2.9.2 Components that have been removed are deposited on the MPRS conveyor. The MPRS conveyor discharges all parts onto the DFS feed gate, from which they are sequenced into the DFS.

14.4.2.10 Burster Removal Station (BRS)

14.4.2.10.1 The BRS is the next station to process the projectiles after the MPRS. The BRS is used to remove bursters from projectiles with the use of high pressure air. The 4.2-inch mortars are not processed by the station. The operation begins when a projectile is sensed by the P4 sensor. The projectile positioning cylinder extends. Then the BRS carriage moves forward, and a delta-P head assembly contacts the projectile. High pressure air (approximately 100 - 300 pounds per square inch) is applied to the head of the projectile. The differential pressure causes the burster to separate from the projectile, and the BRS carriage retracts with the burster. A gripper transfers the burster to a conveyor which in turn transfers the burster to the BSRM. The BSRM shears the burster into sections and feeds them to the DFS.

14.4.2.11 Discharge/Output Station (DS)

14.4.2.11.1 The projectile will be rotated to the DS after its burster is removed at the BRS. The 4.2-inch mortars bypass the MPRS and BRS enroute to the DS. The DS transfers the projectile/mortar to the projectile discharge conveyor. This is accomplished using the PMD transfer conveyor pusher. The projectile discharge conveyor transfers the projectile/mortar to the discharge blast gate. Sensor ZS-147 or ZS-247, for line A or line B, respectively, is interlocked with the discharge blast gate. The sensor allows the discharge blast gate to open and keeps it open until the projectile/mortar has successfully passed out of the ECR.

14.4.2.11.2 After the projectile/mortar exits the ECR, it is tilted to the upright position. A burster detection system, located at the Projectile Output Conveyor discharge stop in the Upper Munition Corridor, checks the projectile to verify that the burster has been removed. If a burster is detected in the projectile, the Multi-position Loader (MPL) will not transfer the projectile to the munitions tray. The projectile with the detected burster will be loaded onto the reject table by the MPL. The reject tables are located next to the Projectile Output Conveyor discharge stop. They can each hold a maximum of four projectiles. Any rejected projectiles will be removed manually by an operator in appropriate PPE. The projectiles are then loaded onto an empty munitions tray by the MPL. The loaded tray will be transported into the MPB, and the projectiles/mortars will be processed by the MDM.

14.4.2.12 System Shutdown (Normal)

14.4.2.12.1 Normal shutdown of the PMDs is done in accordance with standard operating procedures. The system must be first clear of all munitions. The CON operators then issue “stop” and “park” commands to the system. The equipment is placed in home position at this time.

14.4.2.13 Emergency Shutdown

14.4.2.13.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition may include any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.4.2.14 Extended Shutdown

14.4.2.14.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation, or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the PMD systems have been parked. The extended shutdown procedures are implemented during agent campaign changeover.

14.4.2.15 Maintenance

14.4.2.15.1 To ensure that the PMDs are in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the PMDs will be systematically subjected to preventive maintenance inspections.

14.4.3 Monitoring Procedures

14.4.3.1 Each PMD is equipped with several types of sensors to detect the presence and position of projectiles/mortars during operation. These sensors ensure that the projectiles/mortars will be processed safely by relaying information to the PLC. The functions of these sensors are described in Section 14.4.1.11, “Instrumentation”, and summarized in Table 14-4-2.

14.4.3.2 The CON operators monitor the operations of the PMDs through the demilitarization operator consoles and CCTVs. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS provides operational data for analysis and historical records. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements.

14.4.3.3 In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.4.3.4 Chemical agent released in the ECRs will be contained by the sumps or controlled by the HVAC system. ACAMSs are used to monitor for the presence of agent in the ECRs and the ECV.

14.4.3.5 Fire monitoring is described in Section 14.2.1.18, “Fire Protection”.

14.4.3.6 Waste Identification

14.4.3.6.1 By the time a projectile/mortar reaches the PMD, it will have been fully identified per Attachment 2 (Waste Analysis Plan).

14.4.3.7 Waste Throughput

14.4.3.7.1 When a projectile/mortar arrives at the PMD, its nose closure or fuze is removed. Then the supplementary charge or miscellaneous parts (if any) are removed. The next station removes the burster by differential air pressure. The projectiles/mortars are quantified by the PDARS and by the manual record created by the CON operator who observes the PMD in operation.

14.4.4 Inspection

14.4.4.1 See Section 14.2.4.

14.4.5 Closure

14.4.5.1 Partial Closure

14.4.5.1.1 See Section 14.2.5.1.

14.4.5.2 Final Closure

14.4.5.2.1 See Section 14.2.5.2.

14.4.6 Mitigative Design and Operating Standards

14.4.6.1 The ECR is a room where explosives or propellants could potentially be ignited. The design and operating plans for the ECR have been carefully prepared to anticipate this type of mishap. For example, as a worst-case situation, the operating plan limits the total amount of explosives or propellants that are present in the room at any one time so that in the event of an accidental ignition, the ECR could contain the reaction.

14.4.6.2 Protective systems in the ECR include an industrial-type, automatically activated fire sprinkler system. Also, water and decontamination solution outlets are available within the room for final manual wash-down and area cleanup. The floor of the room is sloped to drain to a sump, and the sump de-watering system transfers the collected liquid to the SDS for disposal in one of the two LICs. Protective clothing is mandatory during cleanup of explosive and propellant residues in the room, and care is taken to reduce the potential for residues.

14.4.6.3 If an explosion occurs in a containment room, it is expected that a portion of the agent will be combusted while the remainder will exist in a vapor or liquid form. In the ECR, the agent vapors will be contained in the room because both the blast valves and the leak-tight dampers will be closed. The blast valves will remain closed until the pressure decays to the point where the spring force is greater than the room pressure (0.5 pounds per square inch). At this pressure, the blast valve will open, but the leak-tight damper will continue to contain the gases. The leak-tight dampers will not be opened until the room gas pressure has decayed to approximately atmospheric pressure.

14.4.6.4 The ECR is completely surrounded by rooms that are ventilated to the filter system. Therefore, any leakage out of the ECR as a result of a blast will be vented to the filter system.

14.4.6.5 Liquid agent in the ECR resulting from an explosion will be collected in the ECR sump. Because of the limited number of munitions that will be in the ECR at any one time, the amount of liquid agent released by an explosion is not expected to be greater than about two gallons. Once ventilation has been reestablished in the ECR (by reopening the gas-tight valves), DPE entries will be made, and the area will be hosed down with decontamination solutions. Sufficient decontamination solution will be used to ensure complete neutralization of the agent. The resulting solution will then be pumped to the SDS for later disposal in the LICs.

14.4.6.6 If DPE entry to the ECR is required after processing projectiles/mortars and explosives may be present, the DPE Team shall thoroughly wet each other's DPE and the ECR floor (where they will be working) immediately prior to entering the ECR, to preclude the possibility of static discharge. A water hose is available at the decontamination station by the access door to each ECR.

14.4.7 Environmental Performance Standards for Miscellaneous Units

14.4.7.1 The PMDs have been designed, installed, and will be operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.4.7.2 describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.4.7.2 <u>Miscellaneous Unit Wastes</u>

14.4.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the PMDs include 105mm and 155mm projectiles and 4.2-inch mortars. These wastes have been fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan). The maximum volumes of wastes that will be allowed into the ECR at one time are listed in Table 14-4-1.

14.4.7.2.2 The energetics and chemical agent wastes will be incinerated. The nose closure or fuze and burster removed from the projectiles/mortars will be incinerated in the DFS. The chemical agent will be drained by the MDMs and then incinerated in the LICs. The projectile nose plugs and drained projectiles/mortars will be sent to the MPF.

14.4.7.3 <u>Containment System</u>

14.4.7.3.1 See Section 14.2.7.3.

14.4.7.4 <u>Site Air Conditions</u>

14.4.7.4.1 See Section 14.2.7.4.

14.4.7.5 <u>Topography</u>

14.4.7.5.1 See Section 14.2.7.5.

14.4.7.6 <u>Meteorologic and Atmospheric Conditions</u>

14.4.7.6.1 See Section 14.2.7.6.

14.4.7.7 <u>Air Quality</u>

14.4.7.7.1 See Section 14.2.7.7.

14.4.7.8 <u>Prevention of Air Emissions</u>

14.4.7.8.1 See Section 14.2.7.8.

14.4.7.9 <u>Operating Standards</u>

14.4.7.9.1 Based on the above, chemical agent is assumed to be the pollutant of concern from the PMDs with respect to air emissions.

14.4.7.9.2 Chemical agent emissions from the PMDs will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to the 120-foot HVAC stack.

14.4.7.9.3 The PMDs are located in the ECRs within the MDB. The ECRs are maintained at approximately -2 inches of water column. These two rooms are maintained at the lowest pressures within the MDB so that all air emissions from the PMDs during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.4.7.9.4 Attachment 5 (Inspection Plan) covers the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect chemical agent, and to determine loss of blower performance.

14.4.7.10 Site Hydrologic Conditions

14.4.7.10.1 See Section 14.2.7.10.

14.4.7.11 Migration of Waste Constituents

14.4.7.11.1 See Section 14.2.7.11.

14.5. MULTIPURPOSE DEMILITARIZATION AND PICK AND PLACE MACHINES

14.5.1 Physical Characteristics

14.5.1.1 The TOCDF MDMs are designed to remove burster wells and drain chemical agent from 105mm and 155mm projectiles and 4.2-inch mortar cartridges. The emptied munitions and projectile nose plugs are sent to the MPF for thermal treatment. The chemical agent is collected by the ACS, a separate system that includes the AQS, agent holding tanks, associated pumps, valves, piping, and other ancillary equipment. The agent is then sent to one of the LICs.

14.5.1.2 There are three MDMs in the MPB. Associated with each MDM is a PPM. The PPMs are robotic systems designed to transfer one munition at a time from the munitions trays to the MDMs and then back to the munitions trays. The PPMs do not perform demilitarization operations but are an integral part of the MDM demilitarization process. Therefore, information about them is included in this Permit.

14.5.1.3 For purposes of defining the MDMs, they are considered to begin and end at the pick and place robot loader. The loader is the part of the PPM that removes munitions from the munitions tray. The demilitarization process begins when the munitions tray arrives at the appropriate location in the MPB, as determined by an electronic sensor, and the pick and place loader selects and removes a munition from the tray. The demilitarization process ends, with respect to the MDM, when the pick and place loader retrieves the munition from the MDM and returns it to the tray.

14.5.1.4 The MDMs process munitions that are not configured with explosives, propellants, or other energetics, so the processing system is only concerned with separating the chemical agent from the munition [the explosives, propellants, and energetics are removed in the ECR by the PMD]. The MDMs are similar to the PMDs in that the munitions are placed on an indexing tray that rotates the munitions from one processing station to the next. Each station is designed to perform a different operation. The munitions enter and leave the MDM from the same station (i.e., Load/Unload Station). The following munitions are processed on the MDMs:

14.5.1.4.1 M121, 155mm Projectiles (containing GB)
14.5.1.4.2 M121A1, 155mm Projectiles (VX, GB)
14.5.1.4.3 M104, 155mm Projectiles (H)
14.5.1.4.4 M110, 155mm Projectiles (H)
14.5.1.4.5 M122, 155mm Projectiles (GB)
14.5.1.4.6 M360, 105mm Projectiles (GB)
14.5.1.4.7 M2, 4.2-inch Mortar Cartridges (HT)
14.5.1.4.8 M2A1, 4.2-inch Mortar Cartridges (HD).

14.5.1.5 Equipment Installation

14.5.1.5.1 The equipment that constitutes the MDMs and PPMs has already been installed, and the installation of these machines and their support equipment has been verified through the Facility Construction Certification documentation required by Condition I.S. This Certification attests that the MDM/PPM processing system equipment has been installed in accordance with the equipment's design specification and drawings, as stated in the Permit. Information about the Certification documentation is referenced herein to avoid duplication in this Permit.

14.5.1.6 Dimensions and Location

14.5.1.6.1 The PPMs straddle the MDMs as well as each conveyor line (Line A and Line B) in the MPB. The width of the PPMs is approximately 35 feet. The height to the centerline of the mast, which supports the pick and place robot loader carriage, is approximately 12 feet. The height to the top of the carriage is approximately 15 feet.

14.5.1.6.2 The MDMs and PPMs are located on the second floor of the MDB in the MPB.

14.5.1.7 Conveyors

14.5.1.7.1 Munitions are transported to the MDMs using Line A and Line B conveyor systems. Each line is composed of three conveyors. The conveyors automatically transport munitions trays to the correct location for pick and place operations. Various sensors located along the conveyor rails detect the presence of munitions trays, adjust the tray speed, and stop the trays as needed.

14.5.1.8 Gates

14.5.1.8.1 The munitions trays are transferred automatically from the Upper Munitions Corridor into the MPB through one of the two MPB gates. These gates are opened to receive munitions. The gates are not interlocked with the MDMs or PPMs, but they are interlocked with sensors that detect the presence of a munitions tray beneath the gate (see Section 14.5.2.6, "Interlock Processes").

14.5.1.9 Pump and Transfer Lines

14.5.1.9.1 The MDMs are equipped with pumps to remove agent from the munitions. The agent is transferred by a pump from the munitions through lines connecting the pumps to the ACS. The ACS storage tanks are located in the MDB.

14.5.1.10 Tanks and Containers

14.5.1.10.1 There are no tanks or containers directly associated with the MDMs for the processes addressed in this Permit. However, there is a tank on each MDM that is part of the AQS, which is part of the ACS. The tank associated with the MDMs is either a 1.5-inch or 3-inch diameter tank. The 3-inch diameter tanks are used during processing of 105 mm projectiles, 155mm projectiles and 4.2 inch mortars, while the 1.5-inch tanks are also used during processing of 105mm projectiles.

14.5.1.11 Feed System

14.5.1.11.1 The PPMs are the waste feed system for the MDMs. The PPMs are fully automated (or manually operated) robotic systems that move waste munitions to the MDMs for processing and then return them to the munitions trays. Agent removed from munitions at the MDM is collected by the AQS and sent to the LICs. In addition, the processed munitions are fed to the MPF for thermal treatment.

14.5.1.11.2 As will be discussed in later sections, the PPM is connected to the PDARS that records the number of munitions processed by the MDMs. The rate at which waste munitions are fed to the MDM depends on the type of munition (only one type of munition is processed at a time). The MDMs can hold up to six munitions of the same caliber and fill-type at a time. Processing time varies depending primarily on the time it takes to drain the various size munitions and load/unload them.

14.5.1.12 Instrumentation

14.5.1.12.1 Instruments associated with the MDMs are remotely monitored in the TOCDF CON. The instruments are primarily associated with the hydraulic and pneumatic systems, electronic position sensors, drain verification system, and interlocks. The sensors provide input to the programmable logic controllers (PLC) for automatic processing of various munitions. The PLCs, in turn, control the automatic function of the various MDM instruments.

14.5.1.12.2 Table 14-5-1[6] summarizes the various sensors for the MDM and their functions. The instruments, and their tag numbers, are shown on drawings contained in Attachment 11 (General Facility Drawings).

14.5.1.13 Electrical System

[6] All tables are located at the end of this Attachment.

14.5.1.13.1 See Section 14.2.1.16.

14.5.1.14 Heading, Ventilation, and Air Conditioning System (HVAC)

14.5.1.14.1 See Section 14.2.1.17.

14.5.1.15 Fire Protection System

14.5.1.15.1 See Section 14.3.1.14.

14.5.1.16 Alarm and Communication Systems

14.5.1.16.1 See paragraph 14.3.1.15.

14.5.2 Operations and Maintenance

14.5.2.1 After the explosive components of the munitions have been removed in the ECR, trays of munitions are transported by the Charge Car, located in the Upper Munitions Corridor, to the MDMs in the MPB via the Line A or Line B MPB feed conveyors. The MDMs and PPMs are fully automated but can be operated manually (remotely or locally controlled), if required. A brief description of the MDMs and PPMs operation is contained in the following sections.

14.5.2.2 General System Operation

14.5.2.2.1 Each of the three MDMs can be operated separately, in conjunction with either of the other two MDMs, or simultaneously with both of the other two MDMs.

14.5.2.2.2 Prior to startup, the CON operators execute a series of computer commands to initiate the MDMs and PPMs. To begin MDM operations, the operators in the CON then issue a "start" command. The initiation and startup procedures, respectively, are described in the next sections.

14.5.2.2.3 The trays come into the MPB through the MPB gates after being processed in the ECR (see Section 14.4 for ECR demilitarization machine operations). The CON operators use the CCTVs to verify that a munitions tray has arrived at the correct conveyor location for pick and place operations and also to verify the number of munitions in each tray. The number of munitions is recorded in a logbook.

14.5.2.2.4 The PPM selects a munition and lifts it from the munitions tray. The munition is carried to MDM Station 1 (Load/Unload Station), which serves as the delivery point for munitions entering the MDM and as the pickup point for munitions exiting the MDM. Several electronic sensors are used to monitor the presence of munitions at each MDM station (see Section 14.5.2.6 for a description of these sensors). Each munition is placed in the station vertically with the base down and the nose up.

14.5.2.2.5 The first munition delivered to the MDM is rotated to Station 2, and another munition is retrieved by the PPM and delivered to the Load/Unload Station. Then both munitions are rotated so that the first munition goes to Station 3 and the second moves to Station 2.

Another munition is placed in the Load/Unload Station and the table is rotated again. Eventually, the MDM is operated so that all six stations have a munition (except when the munitions tray does not have enough remaining unprocessed munitions to deliver to the MDM). Stations 2 and 3 do not perform any operations.

14.5.2.2.6 Station 4 is normally used as the Bore Station. It is designed to bore out welded or stuck burster wells. This station is not expected to be used very frequently because most of the munition burster wells were assembled with the press fit method. If a munition requires boring, a clamp cylinder extends and holds the munition in place while the boring head (consisting of an appropriately sized spade drill bit) bores vertically down through the top of the munition. The bore head is raised and lowered by a feed cylinder that contains the bore head drill and motor and is mounted on four vertically-mounted bolster rods. As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station, which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed.

14.5.2.2.7 Station 5 is the Pull and Drain Station. It is designed to remove the burster well, thus providing access to the agent-filled cavity in the munition, and then to drain the agent from the munition. Upon entering Station 5, the munition is lifted slightly and held in place while the carriage assembly, which contains a collet assembly and pull cylinders, is lowered so that the collet assembly enters the munition. The collet expands to grip the burster well, and the pull cylinders extend to raise the collet assembly and the burster well from the munition.

14.5.2.2.8 After the burster well is removed from the munition, the munition is shifted horizontally into the Drain Station position. A drain tube, which consists of a straight, hollow, steel tube, is lowered into the munition, and the ACS removes the agent from the munition. Under normal operations, it is expected that some of the agent will not be removed by this process. After draining the munition, the drain tube is retracted, the munition returns to the Pull Station, and the burster well is placed back in the munition (or, for some munition types, it is dropped into the burster well chute). Station 5 contains a drip pan to collect residual agent that may drip from the burster well and agent drain tube.

14.5.2.2.9 Station 6 is the Crimp Station. It is designed to remove the burster well from the munition and crimp it. Crimping the burster well deforms it so that it no longer seats completely in the munition when replaced. The resulting gap between the burster well and the agent cavity allows a more thorough thermal combustion of the agent heel in the MPF. The burster well is removed from the munition by the burster well gripper assembly. The burster well crimp jaw closes around the burster and deforms it. A strip cylinder is used to remove the burster well from the gripper assembly, where it may become stuck during compression.

14.5.2.2.10 The munition is rotated to Station 1 after it is drained and the crimped burster well is placed back into the munition (except for those munitions where the burster well is discarded at Station 5). A burster well detector sensor located at Station 1 checks for the presence of a burster well. If a burster well is not detected, the PPM places the munition on the reject table. If a burster well is detected, the munition is removed by the PPM and placed back in the munitions tray. The PPM straddles both conveyor lines so that, if needed, the MDMs could be fed from either line. The MDMs are not currently designed to feed munitions from one munitions tray on Line A, for example, and place it in a different munitions tray on Line B. The system is only designed to pick and place munitions from the same munitions tray on the same conveyor line.

14.5.2.3 Setup Procedures

14.5.2.3.1 The MDMs are initialized before being placed in service. All major system components are remotely activated from the CON, and the PLCs verify the proper operation of the system. These systems include instrument air, plant air, hydraulics, ACS, and conveyors. The indicators in the CON are observed to verify the status of the MDMs and auxiliary systems. The MDM system initialization icon is selected and, after the flashing green icon turns steady green, the MDMs are ready to receive a start command from the CON.

14.5.2.4 System Startup

14.5.2.4.1 The startup of the MDMs consists of preparing the MPB conveyors, preparing the MDMs, and preparing the pick and place loader. The MDM/PPM startup procedures are described in the standard operating procedures document. In summary, the CON operators start the system by placing the equipment in automatic mode (which is done remotely from the CON) and issuing a start command to the Line A and Line B conveyors and MDMs/PPMs. An initialization command is issued before the machines are ready to receive munitions.

14.5.2.5 Feed

14.5.2.5.1 As discussed earlier, each munition is fed one at a time to the MDMs by the pick and place loader. The munitions arrive on a munitions tray with the head (top) of the munition pointing up toward the ceiling. The trays are referred to as "egg crates" because of the way the munitions are arranged in rows and columns on the tray. The munitions tray does not have to be completely filled for MDM operations.

14.5.2.5.2 The munitions tray is automatically adjusted by the conveyors into a pre-established position under the pick and place loader. The munitions tray is indexed forward (or backward) so that each row and column of munitions is accessible by the pick and place loader. This is done automatically, but the CON operators can also input a row/column designation so that the tray will be moved to a corresponding location on the conveyor. The CON operators record each munition that is loaded, unloaded, or rejected. In addition, the PDARS maintains a similar count for each munitions tray.

14.5.2.6 Interlock Processes

14.5.2.6.1 Conveyor Systems

14.5.2.6.1.1 The MDM conveyors are interlocked with the MDMs. That is, when the MDMs are processing munitions, the corresponding MDM conveyors will not automatically move the munitions tray to the next (or previous) conveyor. In addition, the individual conveyors are interlocked so that if two munitions trays are on the same line, the conveyors cannot be activated so that two munitions trays are sent to the same conveyor section. Tables 14-5-1 and 14-5-2 indicate the sensors on the MDMs and the conveyors.

14.5.2.6.1.2 The MPB Feed Conveyors are interlocked with the MPB gates so that when a munitions tray is entering the MPB, the gates cannot close. The sensors that interlock the gates are photoreflective sensors ZS-374 (Line A) and ZS-474 (Line B).

14.5.2.6.2 <u>Station 1: Load Station</u>

14.5.2.6.2.1 The PPM delivers munitions one at a time to and from the Load/Unload Station. This station has two sensors. Sensor X-101C (where X is a value of 1, 2, or 3 and refers to the specific MDM) checks for the presence of a munition at the Station, and sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup to discharge a drained projectile body. The MDM and PPM are interlocked so the MDM does not operate independently from the pick and place loader during loading or unloading operations.

14.5.2.6.3 <u>Station 2: Spare Station 1</u>

14.5.2.6.3.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.4 <u>Station 3: Spare Station 2</u>

14.5.2.6.4.1 This station is a spare and does not have any sensors or interlocks. No demilitarization operations are conducted at this station.

14.5.2.6.5 <u>Station 4: Bore Station</u>

14.5.2.6.5.1 The Bore Station is normally bypassed unless the munitions lot is determined to have burster wells that are seal-welded. However, if the lot does include seal-welded burster wells, the Bore Station is enabled and is the first stop for the munition at the MDM.

14.5.2.6.5.2 The Bore Station has several sensors. Sensors 402A/B sense if the projectile clamp is extended or retracted, and sensor 404C indicates whether the munition is clamped. These sensors interlock the MDM Indexing Table and bore head. The bore will not start until the munition is clamped. In addition, sensors 403A/B, which sense the position of the bore head, also are interlocked with the MDM.

14.5.2.6.5.3 As an alternative, this position can also be configured as a Nose Closure Removal/Burster Detection Station which may be used to process projectiles received at the TOCDF without bursters. At this station, the nose plugs will be removed and the absence of a burster will be confirmed. Sensors 404A/B confirm the absence of a burster and activate an alarm if a burster is detected.

14.5.2.6.6 <u>Station 5: Pull and Drain Station</u>

14.5.2.6.6.1 The Pull and Drain Station is a two-step process. Step one is the removal of the burster well from the munition. Sensor X-504C on the Pull and Drain Station indicates whether the burster is removed from the munition.

14.5.2.6.6.2 Step two is the draining of agent. Sensors X-510A/B indicate whether the drain tube has been extended into the munition, and sensors X-506A/B indicate if the drip pan and burster well chute are in the correct place. Additional sensors indicate whether the various hydraulic cylinders are extended or retracted.

14.5.2.6.6.3 The Station 5 sensors are important because they interlock the MDM Index Table so that it does not rotate during operations. In fact, each Station must have completed its operation before the MDM Index Table will rotate the munitions to the next station.

14.5.2.6.7 Station 6: Crimp Station

14.5.2.6.7.1 The Crimp Station has two operations that depend on whether the burster well is removed and discarded at Station 5. A collet cylinder gripper (an expandable collet) enters the munition, and pressure sensor X-603C indicates the presence or absence of the burster well. An alarm will be sent to the CON if a burster well is present when it should have been discarded or if the burster well is absent when it should be present. If either condition exists, the munition is rejected and the pick and place loader will place the munition in the corresponding reject table, which can hold four 155 mm munitions, six 105 mm munitions, or six 4.2 inch mortars. For each MDM, there is one reject table (see Section 14.5.3.4 for more on waste throughput).

14.5.2.6.7.2 The remaining sensors at Station 6 indicate the position status of the various hydraulic cylinders. Station 6 sensors are important because they interlock the MDM Index Table so that it does not rotate during operation. When operations are completed at Station 6 and all other stations on the MDM have finished, the munition in Station 6 is rotated to Station 1.

14.5.2.6.8 Station 1: Unload Station

14.5.2.6.8.1 Sensor X-101D checks for the presence of a burster well before the pick and place loader lowers for pickup.

14.5.2.7 System Shutdown (Automatic, Normal)

14.5.2.7.1 Shutdown of the MDMs consists of stopping and “parking” the PPM loader, MDMs, and MPB conveyors. The pick and place loader is issued a command that places the carriage in its "home" position and lowers the loader (end effector) to its fail safe position. The MDMs are shut down only after the Index Tables are verified to be clear of munitions.

14.5.2.7.2 The MDM conveyors are shut down one line at a time (if both were being used for operations). Both lines must be clear of munitions trays before stopping the conveyor systems. The conveyors are issued a “stop” command, and the Line A and/or Line B icon turns to magenta to indicate that the MDM conveyors are no longer started. After these commands are completed, the MDM, PPM, and conveyors are “parked” and system components are in their home positions.

14.5.2.8 Emergency Shutdown

14.5.2.8.1 In the event of an abnormal or upset condition associated with the MDMs, PPMs, or MDM conveyors, the processing operations are modified in order to mitigate the condition. Abnormal or upset conditions are any conditions that cause an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. These conditions are identified by plant personnel or indicated by the process sensors (which send signals to the CON through the PLCs). After conditions are identified, the CON issues an emergency stop command to the MDM. When this command is issued, the MDM components are stopped.

14.5.2.9 Extended Shutdown

14.5.2.9.1 Extended shutdown procedures are in addition to normal shutdown procedures. Extended shutdown involves installing a spectacle blind in the agent line going to the Toxic Cubicle. This prevents backflushing and leakage of agent from the agent holding tanks.

14.5.2.10 Maintenance

14.5.2.10.1 Maintenance of the MDMs and PPMs includes preventive maintenance procedures and corrective maintenance procedures. Preventive maintenance procedures generally involve inspections, cleaning (as required), and lubricating (as required) of the MDMs and PPMs.

14.5.3 Monitoring Procedures

14.5.3.1 Each MDM is equipped with sensors to detect the presence, position, and configuration of each munition during operations. The sensors, which are connected through PLCs, ensure that the munitions are processed safely by relaying information to the CON. The locations and functions of these sensors are described in Tables 14-5-1 and 14-5-2.

14.5.3.2 The CON monitors the operations of the MDMs and PPMs through the demilitarization operator consoles and CCTV. The demilitarization operator consoles can display information from the PLCs and sensors. The PDARS acquires operational data for analysis and historical record keeping. Information obtained by the PDARS can be used to meet environmental monitoring and reporting requirements. In addition, the CON operators and outside operators are required to log the events that occur during their shift into their respective logbooks.

14.5.3.3 The MPB is a Category A room, and it is expected that this area will be contaminated by agent (liquid or vapor) as part of normal operations. ACAMSs are used to detect the presence of agent vapors in the MPB.

14.5.3.4 Waste Identification

14.5.3.4.1 As mentioned previously, waste munitions are identified prior to entering the MDMs. The quantity of munitions processed by the MDMs is recorded by the PDARS and confirmed visually by CON operators.

14.5.3.4 Waste Throughput

14.5.3.4.1 The waste entering the MDMs is an agent-filled munition. During treatment by the MDMs, the agent is separated from the munition and handled through the ACS. The metal casing is then returned to the munitions tray for thermal treatment in the MPF. In each case, quantification of waste occurs; the metal casing is quantified through the

PDARS record and by the manual record created by the CON operator who observes the MDM operations.

14.5.3.4.2 As mentioned previously, some munitions may be rejected by the MDMs. The MDM sensors are designed to detect "reject" munitions and notify the CON operators. These munitions are sent to the associated reject table which stands next to the MDM Index Table. These munitions are retrieved manually by plant personnel dressed in appropriate PPE. In every case, the quantity of munitions are recorded by the PDARS and the CON operators maintain a record in their logbooks.

14.5.4 <u>Inspection</u>

14.5.4.1 See Section 14.2.4.

14.5.5 <u>Closure</u>

14.5.5.1 <u>Partial Closure</u>

14.5.5.1.1 At the conclusion of each agent campaign or the beginning of a new munition campaign, the MDMs will be thoroughly decontaminated, as necessary; all decontamination films shall be removed using an appropriate rinse; all clouded observation windows that compromise the ability to view operations shall be cleaned or replaced; and maintenance and repair will be performed, as necessary, on the machines and other room components. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the room, since either the agent or the munition type is being changed. Upon approval for partial closure by the Executive Secretary, the next campaign will commence, when authorized, and when it is appropriate to do so.

14.5.5.2 <u>Final Closure</u>

14.5.5.2.1 Final closure is addressed in Attachment 10 (Closure Plan).

14.5.6 <u>Mitigative Design and Operating Standards</u>

14.5.6.1 The MDMs are designed for demilitarization purposes and do not contain inherent components to mitigate the potential for waste migration to the environment. However, the MPB was designed for this purpose. The MPB will be operated in a manner to reduce the risk of waste constituent migration to the environment, as explained below.

14.5.6.2 The floor of the MPB is impervious and sloped to drain any spills to sumps located in the floor. Protective clothing is mandatory during cleanup of spilled agent in the room, and care is taken to reduce the potential for spills.

14.5.6.3 The MPB will not contain explosively configured munitions. Therefore, the room is not designed for, nor expected to incur, an explosion during munitions demilitarization. However, if an accident occurs, air from the MPB would be captured by the MDB ventilation filter system and would not escape to the atmosphere.

14.5.7 <u>Environmental Performance Standards for Miscellaneous Units</u>

14.5.7.1 The MDMs have been designed, installed, and are operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. The following sections describe the potential for waste constituent releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.5.7.2 Miscellaneous Unit Wastes

14.5.7.2.1 The volume and the physical and chemical characteristics of the wastes to be treated at the MDMs are associated with projectiles and mortar cartridges. These wastes have been fully identified, and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan).

14.5.7.2.2 The maximum volume of agent being processed at the MDMs is equivalent to the number of munitions at each MDM station where agent has not been removed. This is equivalent to five munitions at each MDM times three machines for a total of 15 munitions. This assumes each MDM is being utilized. The largest quantity of agent is associated with the M104 or M110 155mm projectiles (agent H), which were filled with 11.7 pounds of mustard. Thus, the total quantity of agent being processed on all three MDMs is 175.5 pounds. The MDMs do not generate additional hazardous waste except for waste decontamination solution.

14.5.7.3 Containment System

14.5.7.3.1 See paragraphs 14.3.7.3.1. and 14.3.7.3.2.

14.5.7.3.2 As mentioned previously, the maximum number of munitions (containing agent) in the MPB at any time during MDM operations is associated with five munitions trays. However, under normal operations, less than five trays may be present in the MPB. This is because only three trays can be actively used for pick and place operations while any other tray would be idle on one of the BDS indexing conveyors. For analysis purposes, it will be assumed that five munitions trays will be present and that each tray is completely filled with agent-filled munitions. This is equivalent to one of the following:

14.5.7.3.2.1 240 155mm projectiles (48 per tray)
14.5.7.3.2.2 480 105mm projectiles (96 per tray)
14.5.7.3.2.3 480 mortar-cartridges (96 per tray).

14.5.7.3.3 Assuming, for example, each munition is completely filled, the maximum inventory of agent in the MPB during MDM operations is 264 gallons (this corresponds to 240 munitions times a maximum of 11.7 pounds of H per munition). In the event all the agent spills onto the floor of the MPB, the sumps will be able to hold all the spilled liquid.

14.5.7.3.4 In addition to the sumps, the MPB contains curbed walls so that liquid spills and decontamination solution will not leak under doors and gates. The floors and walls are painted with epoxy chemical-agent resistant paints to aid in decontamination.

14.5.7.4 Site Air Conditions

14.5.7.4.1 See Section 14.2.7.4.

14.5.7.5 Topography

14.5.7.5.1 See paragraph14.2.7.5.

14.5.7.6 Meteorologic and Atmospheric Conditions

14.5.7.6.1 See paragraph 14.2.7.6.

14.5.7.7 Air Quality

14.5.7.7.1 See Section 14.2.7.7.

14.5.7.8 Prevention of Air Emissions

14.5.7.8.1 See Section 14.2.7.8.

14.5.7.9 Operating Standards

14.5.7.9.1 The MPB is a Category A area and is under engineering controls at all times, as previously discussed. Liquid wastes are captured and controlled in the containment system, air emissions are controlled by the HVAC system and cleaned through filters, and the MDM operations are continuously monitored by the CON and PDARS. As a result, there is virtually no opportunity for the waste constituents to be released in such a way as to have adverse effects on human health or the environment due to migration into the outdoor environment. The liquids are placed in tanks or, if spilled, are contained in sumps and from there placed in tanks. Volatilized agent is captured by the HVAC system, primarily in carbon beds. The MDMs themselves are operated in a systematic and safe manner whether in automatic or manual mode, thereby reducing the potential for agent to be released and migrate into the air.

14.5.7.10 Site Hydrologic Conditions

14.5.7.10.1 See Section 14.2.7.10.

14.5.7.11 Migration of Waste Constituents

14.5.7.11.1 See Section 14.2.7.11.

14.6 MINE MACHINE

14.6.1 Physical Characteristics

14.6.1.1 The mine handling system, of which the Mine Machine is a part, is designed to prepare VX mines for demilitarization. The mine handling system transports the mines through the ECV to ECR B where the chemical agent from the mine is drained and the mine is then processed through the Deactivation Furnace System (DFS). The chemical agent drained from the mine is collected by the Agent Collection System (ACS), a separate system that includes the Agent Quantification System (AQS) and the agent holding tanks, as well as associated pumps, valves, piping, and other ancillary equipment. It is then incinerated in the Liquid Incinerators (LICs).

14.6.1.2 The mine handling system consists of one process line (Line B) located on the second floor of the MDB. The line consists of conveyors and a Mine Machine.

14.6.1.3 The Rocket/Mine Input Conveyor No. 2 is located in the ECV; it separates the UPA from the ECR. The Mine Machine, which actually punches and drains the mine, is located in ECR B.

14.6.1.4 The mine input conveyors and airlock are not considered part of the Mine Machine but are part of the material handling equipment system.

14.6.1.5 Support Equipment/Structures

14.6.1.5.1 The mines are transferred from the ECV into ECR B through the ECR blast gate MMS-GATE-102. This gate opens to receive a mine or a Mine Component Container (MCC) and will not close until the mine or MCC is transferred completely into the ECR. The MCCs are cardboard containers, shaped like mines, which are used to transfer fuzes and activators through the Mine Machine and to the DFS.

14.6.1.5.2 The Mine Machine is equipped with a pump (ACS-PUMP-108) to remove chemical agent from the mines. The drained chemical agent is transferred from the Mine Machine through lines connecting the pumps to the AQS and ACS.

14.6.1.5.3 To provide effective containment in the event of any spills, leaks, or explosions, the ECR has been equipped with blast doors and blast gates that remain closed while draining operations are taking place. Furthermore, the ECR is provided with a containment sump, and the air from the room is cycled through a ventilation system equipped with carbon filters in order to control emissions. With the blast gates and blast doors closed, the ECR is designed to contain a maximum explosion equivalent to 15 pounds of trinitrotoluene (TNT). Although each mine contains approximately one-pound TNT equivalent of explosives, an MCC contains less since the fuzes and activators weigh much less than the M38 burster that is part of the mine. To ensure that this design limit is not exceeded, no more than twelve items (either mines or MCCs or a combination of the two) are allowed inside the ECR at any given time.

14.6.1.6 Instrumentation

14.6.1.6.1 The Mine Machine is operated by PLCs. The PLCs interface with the controls and instruments for the Mine Machine.

14.6.1.6.2 There are a variety of sensors installed to support the operation of the Mine Machine. The sensors are used to track process flow through the machine and to continually update the PLC with new information. These sensors are listed in Table 14-6-1[7] by tag number, sensor type, and a brief functional description.

14.6.1.7 Utilities

7 All tables are located at the end of this section.

14.6.1.7.1 The electrical system, HVAC system, fire protection system, and alarm and communication systems for the MDB and ECR B are discussed in Sections 14.2.1.16 through 14.2.1.19.

14.6.2 Operations and Maintenance

14.6.2.1 System Operation

14.6.2.1.1 Mines will be delivered to the UPA in ONCs. Each ONC may contain up to twelve mine drums. Each mine drum may contain a maximum of three mines, three fuzes, and three activators. The fuzes and activators are not part of the mine assembly and are packed within different compartments within the mine drum. The ONCs will be monitored as specified elsewhere in the Permit and unpacked. Any sealed[8] ONCs determined to have agent levels greater than 40 TWA will be unpacked in the TMA. However, during routine operations, the mine drums will be unloaded from the ONCs in the UPA and either placed on the bypass conveyor and transferred into the ECV for unpacking or stored on secondary containment pallets in the UPA. Prior to transferring the mine drums into the ECV, the vapor space of each mine drum may be monitored for the presence of agent using a Mine Drum Monitoring Device (MDMD). Any drums identified to contain agent vapor will be conservatively processed as containing “known leakers” and the MDMD will remain on the drum throughout the drum’s MPF processing.

14.6.2.1.2 Mine drums with known leakers are transferred to the ECR for unpacking by personnel wearing the appropriate level of PPE. The same is true for any leakers identified during routine processing in the ECV. If a leaker is found during routine processing in the ECV, the mines, fuzes, activators, packing material, and, as necessary, contaminated PPE (e.g., gloves) will be placed back into the drum in question and the drum will be transferred into the ECR for unpacking. The mines, fuzes, and activators will be processed as described below except a table/cart may not be used and the ECV conveyor operations will be bypassed. Agent-contaminated drum lids, rings, and drums will either be bagged/containerized and placed into storage, processed through the MPF, or both. Agent-contaminated packing (e.g., styrofoam cushioning material) from mine drums that contained leaking mines will be bagged/containerized and placed into storage until a treatment method is approved by the Executive Secretary.

14.6.2.1.3 During routine processing in the ECV, three mines, three fuzes, three activators, and packing material are removed from each drum. Operators may use grippers connected to a jib crane to remove the mines from the drums. The mine drums may be inclined towards the operator to facilitate the removal of the drum contents. Likewise, magnets may be used to facilitate removal of activators and fuzes. As the mines and various components are removed from a drum, they may be placed on a utility cart or unloading table to aid in segregation and transport. The fuzes and activators are loaded into the MCCs. The cart or table containing the mines and MCCs will be rolled from the area adjacent to the bypass conveyor to the area adjacent to the Rocket/Mine Input Conveyor No. 2 (MMS-CNVM-104). Alternatively, operators may use a roller conveyor to transfer mines and MCCs from the bypass conveyor to Rocket/Mine Input Conveyor No. 2.

8 The requirements for overpacks that fail the seal test are described in Permit Condition III.G.4.

14.6.2.1.4 Mines and MCCs are then placed onto Rocket/Mine Input Conveyor No. 2 located in the ECV. This conveyor uses a metering system to transport mines and MCCs through blast gates into ECR B and onto the Mine Machine Feed Conveyor. This conveyor uses a second metering system to meter mines and MCCs to the Mine Machine (MHS-MIN-101). A MCC verification cylinder verifies the type of item, mine or MCC, before the second metering system allows transport to the Orientation Station of the Mine Machine.

14.6.2.1.5 If the item is determined to be an MCC, the yoke rotary actuator will rotate approximately 180 degrees placing the MCC onto the trolley for subsequent feed to the DFS, bypassing the punch and drain operation.

14.6.2.1.6 If the item is a mine, it moves into the yoke of the orientation station. The mine is rotated about 90 degrees to a vertical position and clamped in place. The mine is punched and agent is drained to the Agent Quantification System (AQS) and then to the ACS tanks. The amount of agent that will be drained from each mine is equal to or greater than 95% of the nominal fill. In the event that the AQS fails to remove 95% of the agent from a mine, an alarm will sound, the CON advisor screen will indicate an insufficient drain condition, and the operators will follow the requirements specified in Module VIII of the Permit (ref: Condition VIII.E.15).

14.6.2.1.7 After the mine has been punched and drained, it is rotated further about 90 degrees to the horizontal position and placed upside down on the trolley. The trolley moves the mine into position in the Fuze Well Assembly Removal Station (FARS). (Note: the MCCs pass unchanged through the FARS). The fuze well assembly is unscrewed from the bottom of the mine. The trolley then pushes the mine and fuze well assembly onto the DFS feed chute gate. On occasion the FARS is unsuccessful in removal of the fuze well assembly or is by-passed due to mechanical error. Failure to remove the fuze well and FARS by-pass events will be recorded and evaluated for potential corrective action.

14.6.2.1.8 The mine body, mine components, activators, fuzes and MCCs are all processed in the DFS. Agent contaminated mine drums, lids, rings, and packing material will be managed as described above. Uncontaminated mine drums, lids, rings, and packing material will be managed in accordance with criteria specified in Attachment 2 (Waste Analysis Plan).

14.6.2.2 <u>Interlock Process</u>

14.6.2.2.1 The Mine Machine is operated in either the manual or automatic mode using a system of interlocks. One goal of the various interlocks is to ensure that the procedures executed by the various components of the Mine Machine do not interfere with each other. Another goal is to ensure that the Mine Machine operates in a manner that is safe to human health and protective of the environment. The critical interlocks are identified in Table 14-6-1. In addition, the interlocks remain in place during manual operation. The demilitarization machine operators are required to observe the machines during automatic operations to ensure that any stops in the programmed process sequence are corrected as soon as possible.

14.6.2.3 <u>System Shutdown (Normal)</u>

14.6.2.3.1 Normal shutdown of the Mine Machine is done in accordance with standard operating procedures. The system must first be clear of all munitions. The CON operators then issue “stop” and “park” commands to the system. The equipment is placed in home position at this time.

14.6.2.4 Emergency Shutdown

14.6.2.4.1 In the event of an abnormal or upset condition, an emergency stop is initiated. This is initiated remotely by the CON operator and is done by activating an emergency stop. An abnormal or upset condition may include any condition that causes an emergency termination in processing, nonconformance to a specified procedure, a safety hazard, equipment damage, or injury to personnel. The CON operator will record any abnormal or upset conditions in a logbook.

14.6.2.5 Extended Shutdown

14.6.2.5.1 The extended shutdown will be utilized to protect personnel and equipment during a shutdown period. This operation or parts thereof, can be applied at the discretion of the Shift Manager or his/her designee. Extended shutdown procedures are initiated after the Mine Machine systems have been parked. Some of the extended shutdown procedures are implemented during campaign changeover.

14.6.2.6 Maintenance

14.6.2.6.1 To ensure that the Mine Machine is in operational condition at all times, and to discover and correct any defects before they result in serious damage or failure, the Mine Machine will be systematically subjected to preventative maintenance inspections.

14.6.3 Inspection

14.6.3.1 See Section 14.2.4.

14.6.4 Closure

14.6.4.1 Partial Closure

14.6.4.1.1 See Section 14.2.5.1.

14.6.4.2 Final Closure

14.6.4.2.1 See Section 14.2.5.2.

14.6.5 Mitigative Design and Operating Standards

14.6.5.1 The mitigative design features and operating standards for ECR B are described in Section 14.2.6.

14.6.6 Environmental Performance Standards for Miscellaneous Units

14.6.6.1 The Mine Machine has been designed and will be installed and operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health or the environment. Section 14.2.7 describes the potential for waste constituent releases to the environment (air, soil, and water) for the RSM. The potential releases associated with the RSM are greater than the potential releases associated with the Mine Machine since the RSM includes a shearing operation that releases more agent into the ECR.

14.6.6.2 The potential impact of such releases, and the location and engineering control features of the TOCDF that will mitigate these releases are described in Section 14.2.7 and are applicable to the Mine Machine operation as well as the RSM.

14.6.6.3 Miscellaneous Unit Wastes

14.6.6.3.1 The volume and the physical and chemical characteristics of the wastes to be treated at the Mine Machine include M23 mines and their components. These wastes have been identified and information about their physical and chemical characteristics may be found in this Permit, Attachment 2 (Waste Analysis Plan).

14.6.6.3.2 All components of a mine, including its fuzes and activators are to be incinerated in the DFS (except for the drained chemical agent, which is pumped to the ACS and incinerated in the LICs).

14.6.6.4 Containment System

14.6.6.4.1 The Mine Machine is located in ECR B in the MDB. The containment system for ECR B is further described in the TOCDF RCRA Permit, Table 4. ECR B contains curbs, walls, ceiling, and a sump. The floor is coated with an agent-resistant coating and sloped toward a sump. The walls, curbs, and ceiling are also coated with agent-resistant coating. The sump located in ECR B is a primary containment sump. It has a trench and dimensions of approximately 2.75 by 2.75 by 2.38 feet, with a capacity of about 89 gallons. The volume of the sump is more that sufficient to contain any chemical agent spill in the ECR.

14.6.6.4.2 The sump is constructed with a metal internal liner and an interstitial space that is monitored for the presence of liquid. The external liner for the sump is constructed of cast-in-place, epoxy-coated reinforced concrete. The concrete is designed to be free from cracks or gaps.

14.6.6.4.3 The sump metal internal liner is equipped with a level sensor probe to detect liquid. The presence of material in the interstitial space will be an indication of leakage from the metal sump. The bottom of the liner will be sloped to the level sensor. The liner will normally be empty. The level sensor will activate low, high, and high-high alarms, as appropriate, in the CON. This will provide for detection within 24 hours of occurrence.

14.6.6.4.4 ECR B is inside the MDB and is thus protected from climatic conditions and precipitation so no overflow of the containment system due to run-on will occur.

14.6.6.5 Site Air Conditions

14.6.6.5.1 See Section 14.2.7.4.

14.6.6.6 Topography

14.6.6.6.1 See Section 14.2.7.5.

14.6.6.7 Meteorologic and Atmospheric Conditions

14.6.6.7.1 See Section 14.2.7.6.

14.6.6.8 Air Quality

14.6.6.8.1 See Section 14.2.7.7.

14.6.6.9 Prevention of Air Emissions

14.6.6.9.1 See Section 14.2.7.8.

14.6.6.10 Operating Standards

14.6.6.10.1 Based on the above, agent is assumed to be the pollutant of concern from the Mine Machine with respect to air emissions.

14.6.6.10.2 Agent emissions from the Mine Machine will be captured by the MDB HVAC system and controlled by the MDB carbon filter system. Emissions from the MDB are discharged to a 120-foot stack.

14.6.6.10.3 The Mine Machine is located in ECRB within the MDB. The ECR is maintained at a pressure of approximately -2.0 inches of water column. This room is maintained at the lowest pressures within the MDB so all air emissions from the Mine Machine during normal operations will be captured by the ventilation system rather than migrating to another part of the building.

14.6.6.10.4 Attachment 5 (Inspection Plan) of this Permit covers the MDB ventilation and carbon filter systems. In summary, the ventilation and carbon filter systems will be inspected daily by plant personnel to ensure proper operations of these systems. In addition, some operation procedures have been implemented to minimize the potential for air emissions while operating the Mine Machine:

14.6.6.10.4.1 Munitions will be drained of agent as soon as they are punched, thus reducing the likelihood of evaporation (agent will be collected by the ACS and contained in AQS tanks near the Mine Machine).

14.6.6.10.4.2 Sensors have been installed in the carbon filter system to determine automatically if plugging occurs, to detect agent, and to determine loss of blower performance.

14.6.6.11 Site Hydrologic Conditions

14.6.6.11.1 See Section 14.2.7.10.

14.6.6.12 Migration of Waste Constituents

14.6.6.12.1 See Section 14.2.7.11.

14.7 AIR OPERATED REMOTE ORDNANCE ACCESS SYSTEM (CUTTER MACHINE)

14.7.1 Physical Characteristics

14.7.1.1. The cutter machine is designed to remotely cut into cylindrical items. It may be used for nose closure removal, fuze removal, venting, and access to material or interior components. The machine is primarily made of aluminum and is a commercially available radial pipe cutting machine that has been modified for use in toxic areas. The major components of the system are a stabilizing base, split frame Wachs® cutter, cutter base and stabilizing legs, air motor and speed controller, vent hose, air lubrication mister, mister tube and stand, pyrometer and stand, and an air isolation valve. The split frame major components are: a tool slide, cutter blade, trip assembly, and star wheel. The split frame portion of the cutter is a pre-fabricated stand which has four bolts on the cutter frame. These bolts determine the level of the cut on the item by adjusting the height of the item and positioning it for the cutter.

14.7.1.2. Equipment Installation

14.7.1.2.1. The equipment that constitutes the cutter machine is not a permanently installed item. The cutter machine is intended to be used for the duration of the specialized campaign and then managed in accordance with paragraph 14.7.4, Closure. A cutter machine may be set up in the ECR for explosive or non-explosive configured items, or in the MPB for non-explosive configured items only. In the event of an equipment failure beyond repair, a new cutter machine will be set up as a replacement-in-kind.

14.7.1.3 Dimensions and Location

14.7.1.3.1. The approximate size of the cutter machine is 14 inches in diameter, and 24 inches in height. Machine components are aluminum and steel. Some of the machine components are nickel plated. Dead weight of the cutter machine and split frame cutter is estimated at 60 lbs.

14.7.1.4. Conveyors

14.7.1.4.1. The are no conveyors associated with the Cutter Machine. Items to be processed by the cutter machine are manually placed upon the pre-fabricated stand to position the item.

14.7.1.5 Gates

14.7.1.5.1. Items that are configured with energetics or non-energetics may be transferred either automatically or by remote manual control from the ECV into the ECRs through one of two ECR blast gates. These gates open to receive an item and will not close until the item is transferred completely into the ECR. For non-energetic items to be processed in the MPB, trays are transferred automatically from the Munitions Corridor into the MPB through one of two MPB gates. The gates are opened to receive items and they will not close until the items are transferred completely into the MPB.

14.7.1.6. Pumps and Transfer Lines

14.7.1.6.1. There are no pumps or transfer lines directly associated with the cutter machine.

14.7.1.7. Sump Pump

14.7.1.7.1. Both the ECRs and the MPB are equipped with containment sumps. Sump pump operation is controlled by a local-off-remote switch. When a sump level alarm is sent to the CON, the liquids collected in the sump are pumped to a spent decontamination holding tank.

14.7.1.8. Tanks and Containers

14.7.1.8.1. There are no tanks or containers directly associated with the cutter machine. Agent from the items processed by the cutter machine is either pumped to the ACS or SDS (after initial decontamination at the point of removal) or may be placed in the sumps for further processing.

14.7.1.9. Feed System

14.7.1.9.1. Items to be processed using the cutter machine will be manually placed on the cutter by personnel clad in the appropriate level of PPE based upon the hazards of the operation. All items will be manually processed in accordance with site approved operating procedures.

14.7.1.10. Instrumentation

14.7.1.10.1. There is no permanent PLC interface with the controls and instruments for the cutter machine. Any PLC interfaces that are added will be installed via the Temporary Change Process with all site required signatures and appropriate site reviews. The cutter machine operation is controlled remotely from the CON with careful monitoring via closed-circuit television.

14.7.1.11. Electrical System

14.7.1.11.1. See Section 14.2.1.16.

14.7.1.12. Heating, Ventilation, and Air Conditioning System (HVAC)

14.7.1.12.1 See Section 14.2.1.17.

14.7.1.13. Fire Protection System

14.7.1.13.1. See Section 14.2.1.18.1. and paragraph 14.3.1.14.

14.7.1.14. Alarm and Communications Systems

14.7.1.14.1. See Section 14.2.1.19.1. and paragraph 14.3.1.15.

14.7.2. Operations and Maintenance

14.7.2.1. The cutter machine will be utilized inside the Explosives Containment Rooms or in the Munitions Processing Bay to gain access to munitions or cylindrical items that require special handling. It may be used for nose closure removal, fuze removal, venting, and/or access to interior components. The cutter machine will be used in accordance with site approved operating procedures.

14.7.2.2. General System Operation

14.7.2.2.1. The cutter machine will be located in either ECR A, ECR B, or in the Munitions Processing Bay. The cutter is comprised of two components, the cutter and the split frame which correctly positions the item for the cutter. The cutter machine is a commercially available radial type pipe cutter designed to cut cylindrical items. The cutter is comprised primarily of aluminum components. It has been modified with an air isolation valve and mister tube. After the munition or cylindrical item is placed on the stabilizing base and appropriately prepared for cutting operations, the Control Room remotely activates supplied air to the cutter. The spray mister will begin to function and the cutting speed may be adjusted by the entrants. The mister nozzle tip will spray on the cut path in order to ensure that cutting temperatures remain near ambient. The cut is lubricated by an air mist of water based lubricant. The control room then monitors the cutter operation through the use of CCTV and process indicators in the Control Room. In the case of explosive configured items, while the cutting operations are in progress, entrants will exit the ECR.

14.7.2.3. System Startup

14.7.2.3.1. The procedure for the cutter machine start-up is contained in the appropriate Unusual Munition Handling SOP and related documents. In summary, the machine will be set-up by site personnel who will verify that the equipment is configured properly prior to use.

14.7.2.4. Feed

14.7.2.4.1. The munitions or cylindrical items will be placed upon the cutter machine one at a time for handling. Careful coordination of the operation will occur between the entrants and the Control Room personnel in accordance with site approved standard operating procedures.

14.7.2.5. Interlocks

14.7.2.5.1. Emergency shutoff of the cutter machine is via an air isolation valve. All emergency shutoff valves will be referenced in the appropriate SOPs of the operation.

14.7.2.6. System Shutdown (Normal)

14.7.2.6.1. The cutter machine operation is controlled remotely from the CON. To stop the cutter machine, the air solenoid is closed from the Control Room.

14.7.2.7. Emergency Shutdown

14.7.2.7.1. The Emergency Shutdown process is controlled remotely from the CON. The air solenoid will be shutdown from the CON, causing the cutter machine to stop. All activities are closely monitored by the CON via the CCTV.

14.7.2.8. Maintenance

14.7.2.8.1. The cutter machine is set up for a short-duration use to handle unusually configured munitions or cylindrical items. Since the duration of it's operation is very short, no maintenance plan is required.

14.7.2.9. Monitoring Procedures

14.7.2.9.1. The CON operators monitor the operations of the cutter machine through the use of the CCTVs. In addition, CON operators are required to log the events that occur during their shift into logbooks and the appropriate munitions waste tracking forms.

14.7.2.10. Waste Identification

14.7.2.10.1 By the time a munition or cylindrical item reaches the cutter machine, it will have been fully identified in accordance with Attachment 2 (Waste Analysis Plan).

14.7.2.11. Waste Throughput

14.7.2.11.1 The cutter machine is, by design, used to gain access to the interior portions of a munition or a cylindrical item, to facilitate the appropriate treatment of the waste by allowing munitions or other items to be managed through the other approved treatment processed for agent, overpack material, or metal munition bodies or cylinders. Munitions are manually placed in the cutter by site personnel dressed in the appropriate level of PPE. Any liquid agent that is present during the cutting process is decontaminated with decontamination solution. The spent decontamination solution is collected in the sump and pumped to the SDS tank for eventual thermal treatment in the LIC. Any liquid collected in the sumps is emptied at least daily.

14.7.3. Inspection

14.7.3.1. The cutter machine will be inspected prior to first use after it has been assembled. Since the duration of the cutter machine operation is expected to be short, no permanent inspection plan is in place. The cutter machine is intended to be set-up, used for a short duration that is campaign specific, and dismantled when no longer needed.

14.7.4. Closure

14.7.4.1. Partial Closure

14.7.4.1.1. At the conclusion of the agent campaign, the cutter machine will be thoroughly decontaminated. The equipment may be re-used or scrapped and managed as waste. The TOCDF will submit in writing to the Executive Secretary, a request for partial closure of the cutter.

14.7.4.2. Final Closure

14.7.4.2.1. Final closure of this site is addressed in Attachment 10 (Closure Plan).

14.7.5. <u>Mitigative Design and Operating Standards</u>

14.7.5.1. For the Mitigative Design and Operating Standards for the ECRs, refer to paragraphs 14.2.6.1. through 14.2.6.6. For the Mitigative Design and Operating Standards in the MPB, refer to paragraphs 14.3.6.2. and 14.3.6.3.

14.7.5.2. The cutter machine will be operated in a manner to preclude the release of hazardous chemical constituents that may have an adverse effect on human health and the environment. The following section describes the potential for waste constituent releases to the environment (air, soil, and water), the potential impacts of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.3. <u>Environmental Performance Standards for Miscellaneous Units</u>

14.7.5.3.1. The cutter machine can be installed in either of the ECRs, or in the Munitions Processing Bay for non-explosive configured items. The ECRs and the Munitions Processing Bay have been designed, installed, and operated in a manner to preclude the release of hazardous chemical constituents that may have adverse effects on human health and the environment. Section 14.2.7.2 describes the potential for waste constituents releases to the environment (air, soil, and water), the potential impact of such releases, and the location features of the TOCDF that will mitigate these releases.

14.7.5.4. <u>Miscellaneous Unit Wastes</u>

14.7.5.4.1. The volume and the physical and chemical characteristics of the wastes to be treated at the cutter machine include munitions or other cylindrical items. These wastes will be fully identified and information about their physical and chemical characteristics may be found in Attachment 2 (Waste Analysis Plan) or characterized in accordance with Attachment 2 (Waste Analysis Plan). The maximum volume of these wastes that can be processed in the cutter machine at one time is equivalent to the number of munitions that can be processed by the cutter, which is one. All metal components will be incinerated in the DFS or MPF. Energetic components may be fed to the DFS unsheared in accordance with site approved operating procedures. All drained chemical agent will be pumped to the ACS or the SDS (after initial decontamination at the point of removal) for incineration in the LICs.

14.7.5.5 <u>Containment System</u>

14.7.5.5.1. See Paragraphs 14.2.7.3.1. through 14.2.7.3.4.

14.7.5.6. <u>Site Air Conditions</u>

14.7.5.6.1. See Paragraph 14.2.7.4.1.

14.7.5.7. <u>Topography</u>

14.7.5.7.1. See Paragraph 14.2.7.5.1.

14.7.5.8. Meteorological and Atmospheric Conditions

14.7.5.8.1. See Paragraph 14.2.7.6.1.

14.7.5.9. Air Quality

14.7.5.9.1. See Paragraphs 14.2.7.7.1. through 14.2.7.7.3.

14.7.5.10. Prevention of Air Emissions

14.7.5.10.1. The cutter machine itself is not a source of air emission in and of itself, but it is associated with treatment operations that could potentially emit air pollutants. See Paragraphs 14.2.7.8.1. through 14.2.7.8.5.

14.7.5.11. Operating Standards

14.7.5.11.1. The cutter machine is a commercially available radial pipe cutter. It will be operated in accordance with manufacturer's guidelines and site approved operating procedures.

14.7.5.12. Site Hydrologic Conditions

14.7.5.12.1. A summary of site hydrologic conditions is given in Attachment 1 (Facility Description). For additional description, see Paragraph 14.2.7.10.2.

14.7.5.13. Migration of Waste Constituents

14.7.5.31.1. Migration of wastes into the environment from the cutter machine is not expected to occur. The cutter machine will be operated in the MDB, which is designed to prevent the migration of waste to the environment. Therefore, no impacts on human health and the environment from the cutter machine are expected.

Table 14-2-1
ROCKET SHEAR MACHINE SENSOR FUNCTIONS

Sensor Number	Type of Sensor	Functional Description
PLS-1	Inductive Proximity Switch	Rotary Actuator is sensed at the fully retracted or "home" position.
PLS-2	Inductive Proximity Switch	Rotary Actuator is sensed at the fully extended position.
PLS-3*	Opposed-Beam Photo-Electric (Fiber Optic) Sensor	Indicates rocket presence at the punch and drain position. The switch is located directly in front of the positive stop.
PLS-4*	Inductive Proximity Sensor	Indicates that the pusher index assembly is at the home position. This information is also used to reset the pusher position optical encoder.
RSM-ENC-1*		Rocket Shear System Pusher Index Assembly Optical Encoder
PLS-5A&B*	Opposed-Beam Photo-Electric Sensor	Indicates that the rocket is fully forward against the index stops. The switch sensors are located at about the halfway point on the transport conveyor.
PLS-6*	Opposed-Beam Photo-Electric Sensor	Detects rocket presence and actuates index stops to extend. The switch sensors are located at the end of the rocket trough, just beyond the index stops.
PLS-7* PLS-8* PLS-9*	Inductive Proximity Sensor	All three switches (PLS-7, 8, and 9) are installed and used only during Burster Size Reduction operations. Each switch indicates that the burster is present in that particular zone of the burster chute. The system requires that the burster must make two of three switches before they are indexed forward to the shear station.
* Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.		

Table 14-3-1
LIST OF BULK DRAIN STATION SENSORS AND CRITICAL INTERLOCKS

Sensor Tag	Sensor Type	Functional Description
49-1-P1 (Line A)[a] 49-2-P1 (Line B)[a]	Retroreflector Beam Sensor	Indicates the tray is on the BDS Transfer Conveyor, shifts Transfer Conveyor to slow speed (Start of BDS).
49-1-P2 (Line A)* 49-2-P2 (Line B)*	Inductive Proximity Sensor	Indicates the cradle is at the punch position.[b]
49-1-P3 (Line A)* 49-2-P3 (Line B)*	Inductive Proximity Sensor	Indicates the cradle is at the drain position.
49-1-P4 (Line A)* 49-2-P4 (Line B)*	Inductive Proximity Sensor	Indicates the cradle (ton containers) is in the vent punch position.
49-1-P5 (Line A) 49-2-P5 (Line B)	Retroreflector Beam Sensor	Indicates the tray is transferring to the next Hydraulic Conveyor.
102A1-102A4*	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are extended.
102B1-102B4	Inductive Proximity Sensors	Indicate the Transfer Conveyor Lift Cylinders are retracted.
103A	Inductive Proximity Sensor	Indicates the Punch Cylinder is extended.
103B	Inductive Proximity Sensor	Indicates the Punch Cylinder is retracted.
104A*	Inductive Proximity Sensor	Indicates the Drain Tube is fully extended.
104B*	Inductive Proximity Sensor	Indicates the Drain Tube is fully retracted.
104C	Inductive Proximity Sensor	Indicates the Drain Tube is in Mid-Position 1.
104D	Inductive Proximity Sensor	Indicates the Drain Tube is in Mid-Position 2.
106A1-A2	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are extended.
106B1-B2	Inductive Proximity Sensor	Indicates the Hold Down Cylinders are retracted.
9104A**	Inductive Proximity Sensor	Indicates the Level Probe is fully extended.
9104B	Inductive Proximity Sensor	Indicates the Level Probe is fully retracted.
49-LIT-9001**	Level Sensor	Indicates whether or not the remaining agent heel in ton containers is less than 5% of the nominal fill amount.

Notes:
[a] Sensor can be used to monitor throughput of munitions/bulk items.
[b] Interlocks MDM-GATE-101 and -102
* Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.
** Critical Sensor or Interlock that should be functional when the associated miscellaneous unit is operating. If this Critical Sensor or Interlock is not functional, the drain status of ton containers must be verified by personnel making an entry into the MPB.
BDS = Bulk Drain Station

Table 14-4-1
MAXIMUM EXPLOSIVE WEIGHT IN EXPLOSIVE CONTAINMENT ROOM

	Normal Process Mode		**Reject Process Mode**	
Munitions (Explosive Type)	No. of Rounds/Burster In ECR	Explosive Weight In ECR (TNT_{Eq})	No. of Rounds/Burster in ECR	Explosive Weight In ECR (TNT_{Eq})
105mm/M360 (Comp B)	4	6.12	4	6.12
155mm/M110 (Tetrytol)	4	1.92	4	1.92
155mm/M121 (Comp B)	4	14.12	4	14.12
155mm/M121A1 (Comp B-4)	4	14.12	4	14.12
4.2-in./M2A1 (Tetrytol)	2	0.42	4	0.84

Note:

ECR = Explosive Containment Room

1. Based upon ECR design (ref: Section 14.4.1.4.2), the maximum quantity of explosive material allowed in an ECR is 15 lbs (trinitrotoluene equivalent (TNT_{Eq})). Therefore, in addition to the quantities identified above, the TOCDF may have other explosive materials in the ECR provided that the total quantity in the ECR does not exceed 15 lbs (TNT equivalent). TNT Equivalence is based on the specific explosive type's brisance as compared to TNT as reported in Army Technical Manual TM 9-1300-214.

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
P-1*	Inductive Proximity Sensor, 10mm range	Indicates the munition is in the Transfer Station.
102B	Inductive Proximity Sensor, 10mm range	Indicates the Transfer Conveyor Trolley is in its home position.
103A	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the load position.
103B	Inductive Proximity Sensor, 5mm range	Indicates the saddle is in the unload position.
103C	Inductive Proximity Sensor, 10mm range	Indicates the Index Table is indexed at proper position to line up with each other.
110A/B*	NAMCO Switch	Senses when the burster probe is extended or retracted.
P-2*	Inductive Proximity Sensor, 35mm range	Indicates the munition is in correct position to begin operation at the NCRS.
P-21*	Fiber Optic Sensor	Indicates the fuze/nose closure is in the Chuck Jaws when the NCR carriage is fully retracted.
P-22	Fiber Optic Sensor	Indicates the M557 fuze is in the punch position (M360). Also indicates the burster is in position for unscrewing fuzes from bursters (M2A1).
201B*	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is extended and munition is clamped.
201C	Inductive Proximity Sensor, 5mm range	Indicates the Projectile Clamp Cylinder is retracted and the munition is unclamped.
202A	Inductive Proximity Sensor	Indicates the NCR Carriage is fully extended.
202B	Inductive Proximity Sensor	Indicates the NCR Carriage is fully retracted.
202C	Inductive Proximity Sensor, 5mm range	Indicates the NCR Carriage is in the mid-position.
PS-203A	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully extended or clamped on a nose closure/fuze.
PS-203B	Pressure Switch	Indicates the Hydraulic Chuck Jaws are fully retracted.
PS-204A*	Pressure Switch	Indicates the Chuck Motor (spindle) has stalled.
204C	Inductive Proximity Sensor, 5mm range	Indicates the number of revolutions that the Hydraulic Chuck turns.
206A	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully extended and the Gripper Slide Assembly is in the "up" position.
206B	Inductive Proximity Sensor	Indicates the Gripper Slide Cylinder is fully retracted and the Gripper Slide Assembly is in the down position.
207A	Inductive Proximity Sensor	Indicates the Booster/Burster Gripper Cylinder is fully extended, jaws "open."
P-3*	Inductive Proximity Sensor, 10mm range	Indicates the projectile is in position at the MPRS.
P-31*	Fiber Optic Sensor	Indicates the fuze well cups and supports are removed at the MPRS.
301A	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is raised.
301B	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
302A	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is extended.
302B	Inductive Proximity Sensor	Indicates the Projectile Hold Down Cylinder is retracted.
303A	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is extended and carriage is in "home" position.

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
303B	Inductive Proximity Sensor	Indicates the MPR Carriage Cylinder is retracted and carriage is in fully "forward" position.
303C	Inductive Proximity Sensor, 5mm range	Indicates the MPR Carriage is in mid-position.
303D	Inductive Proximity Sensor, 5mm range	Indicates the MPR Carriage is in position to begin bakelite fuze well cup cutting sequence (for M110 projectiles only).
304A	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is extended to release Collet.
304B	Inductive Proximity Sensor	Indicates the Fuze Well Cup Collet Release Cylinder is retracted to set the Collet.
308A	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is extended (M121A1 only).
308B	Inductive Proximity Sensor, 5mm range	Indicates the Air-Probe Cylinder is retracted (M121A1 only).
P-4*	Inductive Proximity Sensor, 35mm range	Indicates a projectile is in correct position at the BRS.
401A	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully extended and the V-plate is "raised."
401B	Inductive Proximity Sensor	Indicates the Projectile Positioning Cylinder is fully retracted and the V-plate is "down."
402A	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is fully extended (forward).
402B	Inductive Proximity Sensor, 5mm range	Indicates the BRS Carriage is in the retracted position.
402C	Inductive Proximity Sensor, 10mm range	Indicates the BRS Carriage has retracted to the mid-position to allow the burster to be gripped by the Burster Gripper.
403A*	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder is fully extended.
403B*	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder has fully retracted to the "failed to Extract Burster" position.
403C	Inductive Proximity Sensor, 10mm range	Indicates the Delta-P Cylinder head has retracted part way to the "Air Off" position and extended part way to the "Collet Released" position.
404A	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully extended and the Burster Conveyor is in the "lowered" position.
404B	Inductive Proximity Sensor	Indicates the Burster Conveyor Lift Cylinder is fully retracted and the Burster Conveyor is in the "raised" position.
405A	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is extended and jaws are "closed."
405B	Inductive Proximity Sensor	Indicates the Burster Gripper Cylinder is retracted and jaws are "open."
406A	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in position over the burster.
406B	Inductive Proximity Sensor, 10mm range	Indicates the Burster Gripper Assembly is in its "Home" position over the BSR chute.
PMD-ENC-1*		Transfer Conveyor Optical Encoder (20904)
300V1	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the MPRS Air Blast Tube.
300V2	2-way solenoid valve, normally	Used to provide 300 psi compressed air to the MPRS Air

Table 14-4-2
PROJECTILE/MORTAR DISASSEMBLY MACHINE SENSORS

Sensor Tag	Sensor Type	Functional Description
	closed	Blast Tube.
308VA	4-way, two position, solenoid valve	Used to provide 100 psi compressed air to extend and retract the MPRS Air-Probe (M121A1).
400V1	2-way solenoid valve, normally closed	Used to provide 100 psi compressed air to the BRS Delta-P Head Assembly (and 300 psi compressed air in when operated with 400V3).
400V2	2-way solenoid valve, normally closed	Used to vent 100 psi or 300 psi compressed air from the Delta-P Head Assembly.
400V3	2-way solenoid valve, normally closed	Used to provide 300 psi compressed air to the BRS Delta-P Head Assembly.

Notes:
BRS = Burster Removal System
MPR = Miscellaneous Parts Removal
MPRS = Miscellaneous Parts Removal Station
NCR = Nose Closure Removal
NCRS = Nose Closure Removal System
PLC = Programmable Logic Controller
Psi = Pounds per Square Inch
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS

Sensor Tag[a]	Sensor Type	Location of Sensor	Functional Description
45-1-100C	Proximity Detector Stations	Index Table	Indicates the Index Table is properly aligned with MDM.
45-1-101A/B	NAMCO Switch	Index Table	Senses when projectile slide cylinder #1 is extended/retracted.
45-1-101C*	Proximity Detector	Station 1	Senses when a munition is at the LUS.
45-1-101D*	Fiber Optic Sensor	Station 1	Senses the presence of a crimped burster well at the LUS during the reinsert mode.
45-1-401A/B	NAMCO Switch	Station 4	Senses when projectile slide cylinder #4 is extended/retracted.
45-1-402A/B	NAMCO Switch	Station 4	Senses when the projectile clamp cylinder is extended/ retracted.
45-1-402C	Pressure Switch	Station 4	Senses when the projectile clamps are clamped.
45-1-403A/B	NAMCO Switch	Station 4	Senses when the boring head feed cylinder is fully extended/retracted.
45-1-404A/B*	NAMCO Switch	Station 4	Senses when the burster probe is extended or retracted.
45-1-406A/B	NAMCO Switch	Station 4	Senses when the plug transition chute is extended/retracted.
45-1-407	Vaccon Vacuum Switch	Station 4	Verifies that a plug is present in the socket assembly.
45-1-501A/B	NAMCO Switch	Station 5	Senses when the projectile slide cylinder #5 is extended/retracted.
45-1-502A/B	NAMCO Switch	Station 5	Senses when the projectile lift cylinder is extended/retracted.
45-1-503A/B 1&2	NAMCO Switch	Station 5	Senses when the carriage cylinder is extended/retracted.
45-1-504A/B 1&2	NAMCO Switch	Station 5	Senses when the pull cylinder is extended/retracted.
45-1-504C*	Proximity Detector	Station 5	Senses burster well when pulled.
45-1-505A/B	NAMCO Switch	Station 5	Senses when the collet set cylinder is extended/retracted.
45-1-505C	NAMCO Switch	Station 5	Senses when the collet is set in the burster well.
45-1-506A/B	NAMCO Switch	Station 5	Senses when the drip pan cylinder (pull Station) is extended/retracted.
45-1-507A/B	NAMCO Switch	Station 5	Senses when the burster well chute cylinder is extended/retracted.
45-1-509A/B	NAMCO Switch	Station 5	Senses when the drip pan cylinder (Drain Station) is extended/retracted.
45-1-510A/B*	NAMCO Switch	Station 5	Senses when the drain tube cylinder is extended/retracted.
45-1-510C*	Proximity Sensor	Station 5	Senses when the drain tube is at the bottom of the munition.
45-1-601A/B	NAMCO Switch	Station 6	Senses when the projectile slide cylinder #6 is extended/retracted.
45-1-602A/B	NAMCO Switch	Station 6	Senses when the burster well lift cylinder is extended/retracted.

Table 14-5-1
SUMMARY OF MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE SENSORS

Sensor Tag[a]	Sensor Type	Location of Sensor	Functional Description
45-1-603A/B	NAMCO Switch	Station 6	Senses when the collet set cylinder is extended/retracted.
45-1-603C	Pressure Switch	Station 6	Senses when the collet is set in the burster well.
45-1-604A/B	NAMCO Switch	Station 6	Senses when the burster well crimp cylinder is extended/retracted.

Notes:
[a] Sensor tags are identical for all three MDMs and PPMs except for the second number which is "2" or "3" for MDM-102 and MDM-103, respectively.
LUS = Load/Unload Station
MDM = Multipurpose Demilitarization Machine
* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

Table 14-5-2
MULTIPURPOSE DEMILITARIZATION MACHINE AND PICK AND PLACE MACHINE CRITICAL SENSORS AND INTERLOCKS

Sensor Tag	Sensor Type	Functional Description	Interlock
45-10-25-154	Proximity Detector	Senses munition tray at Line A, MDM-101	Conveyor MDM-CNVP-101
45-10-25-170	Proximity Detector	Senses munition tray at Line A, MDM-102	Conveyor MDM-CNVP-103
45-10-25-160	Proximity Detector	Senses munition tray at Line A, MDM-103	Conveyor MDM-CNVP-105
45-10-25-254	Proximity Detector	Senses munition tray at Line B, MDM-101	Conveyor MDM-CNVP-102
45-10-25-270	Proximity Detector	Senses munition tray at Line B, MDM-102	Conveyor MDM-CNVP-104
45-10-25-260	Proximity Detector	Senses munition tray at Line B, MDM-103	Conveyor MDM-CNVP-106

Table 14-6-1
SUMMARY OF MINE MACHINE SENSORS (ECR B)

Sensor Tag	Sensor Type	Functional Description
03-ZS-201A	NAMCO	Senses swing roller is up
03-ZS-201B	NAMCO	Senses swing roller is down
44-ZS-103	RETROREFLECTIVE	Senses mine is present on MHS-MIN-101
44-ZS-415A	NAMCO	Senses ECR index stop is raised
44-ZS-415B	NAMCO	Senses ECR index stop is lowered
44-ZS-416A	NAMCO	Senses ECR feed stop is raised
44-ZS-416B	NAMCO	Senses ECR feed stop is lowered
44-ZS-417A	NAMCO	Senses MCC verification is extended
44-ZS-417B	NAMCO	Senses MCC verification is retracted
44-ZS-418	RETROREFLECTIVE	Senses mine is present at ECR index stop
44-ZS-419	FIBEROPTIC	Senses mine is present at ECR feed stop
03-ZS-223A	NAMCO	Senses MIN-GATE-102 is raised
03-ZS-223B	NAMCO	Senses MIN-GATE-102 is lowered
44-I1-PLS-13	FIBEROPTIC	Senses mine or MCC is pushed out to DFS
44-I1-PLS-1	MAGNETIC	Senses metal mine is staged
44-I1-PLS-2*	MAGNETIC	Senses mine is oriented correctly
44-I1-PLS-4	MAGNETIC	Senses yoke rotator is in home position
44-I1-PLS-5	MAGNETIC	Senses yoke is in vertical position
44-I1-PLS-6	MAGNETIC	Senses yoke rotator is in discharge position
44-I1-PLS-7	MAGNETIC	Senses trolley cylinder is retracted
44-I1-PLS-8	MAGNETIC	Senses trolley cylinder is extended
44-I1-PLS-9	FIBEROPTIC	Senses that mine is at FARS station
44-I1-PLS-10	MAGNETIC	Senses trolley is at mid position
44-I1-PLS-11	FIBEROPTIC	Senses mine in in yoke discharge position
44-I1-PLS-12	FIBEROPTIC	Senses mine is in yoke
44-ZS-102A	NAMCO	Senses orientation station cylinder is raised
44-ZS-102B	NAMCO	Sense orientation station cylinder is lowered
44-ZS-104A	NAMCO	Senses yoke stop cylinder is open
44-ZS-104B	NAMCO	Senses yoke stop cylinder is closed
44-ZS-106A	NAMCO	Senses FARS cylinder is lowered
44-ZS-106B	NAMCO	Senses FARS cylinder is raised
44-ZS-107A*	NAMCO	Senses drain/punch cylinder is extended
44-ZS-107B	NAMCO	Senses drain/punch cylinder is retracted
44-ZS-108A*	NAMCO	Senses clamp cylinder is extended
44-ZS-108B	NAMCO	Senses clamp cylinder is retracted
03-ZS-9001	RETROREFLECTIVE	Senses mine is at ECR staging position

* = Critical Sensor or Interlock that must be functional when the associated miscellaneous unit is operating.

ATTACHMENT 19
INSTRUMENTATION AND WASTE FEED CUT-OFF TABLES

Consisting of:

Table D-1
TRIAL BURN PLANS AND REPORTS

Surrogate Trial Burn for Liquid Incinerator Number 1 (LIC1)

- Surrogate Trial Burn Plan, submitted January 24, 1995 and revised April 24, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.00325 and 95.01951.

- Surrogate Trial Burn Report submitted August 23, 1995, and revised December 1, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.03837 and 95.05298.

Surrogate Trial Burn for the Deactivation Furnace System (DFS)

- Surrogate Trial Burn Plan, submitted March 9, 1995 and revised August 8, 1995. Supplemental DFS Trial Burn Test Special Conditions appended September 6, 1995. Utah Division of Solid and Hazardous Waste Tracking Number 95.03661.

- Surrogate Trial Burn Report, submitted November 20, 1995, and revised December 12, 1995. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.05217 and 96.00196.

Surrogate Trial Burn for Liquid Incinerator Number 2 (LIC2)

- Surrogate Trial Burn Plan, submitted June 15, 1995, and revised December 18, 1995. Utah Division of Solid and Hazardous Waste Tracking Number 95.05551.

- Surrogate Trial Burn Report, dated April 19, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.01988

Surrogate Trial Burn for Metal Parts Furnace (MPF)

- Surrogate Trial Burn Plan, submitted December 19, 1995, and revised March 13, 1996. Utah Division of Solid and Hazardous Waste Tracking Numbers 95.05572 and 96.01181.

- Surrogate Trial Burn Report, dated August 12, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.03460.

RCRA GB Agent Trial Burn for the Deactivation Furnace System (DFS)

- GB Agent Trial Burn Plan, submitted November 29, 1995, revised June 6, 1996 and August 13, 1998. Utah Division of Solid and Hazardous Waste Tracking Numbers 96.02580 and 98.03264.

- GB Agent Trial Burn Report, dated February 16, 1999, and revised July 7, 1999. Utah Division of Solid and Hazardous Waste Tracking Numbers 99.00735 and 99.02812

RCRA GB Agent Trial Burn for the Liquid Incinerators (LIC)

- GB Agent Trial Burn Plan, submitted November 29, 1995, and revised June 12, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.02670.

- GB Agent Trial Burn Report Liquid Incinerator 1(LIC1), submitted Revision 2 dated July 15,

1998. Utah Division of Solid and Hazardous Waste Tracking Number 97.02654.

- GB Trial Burn Report for the Liquid Incinerator 2 (LIC 2), dated October 27, 1997. Utah Division of Solid and Hazardous Waste Tracking Number 97.04218.

RCRA GB Agent Trial Burn for the Metal Parts Furnace (MPF)

- GB Agent Trial Burn Plan, submitted April 20, 1996, and revised October 30, 1996. Utah Division of Solid and Hazardous Waste Tracking Number 96.04738. Modified March 12, 1997, Utah Division of Solid and Hazardous Waste Tracking Number 97.01013.

- GB Agent Trial Burn Report, dated July 29, 1997. Utah Division of Solid and Hazardous Waste Tracking Number 97.03183.

RCRA VX Agent Trial Burn for the Deactivation Furnace System (DFS)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02406, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002.

RCRA VX Agent Trial Burn for the Metal Parts Furnace (MPF)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02408, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002.

RCRA VX Agent Trial Burn for the Liquid Incinerators (LIC)

- VX Agent Trial Burn Plan, submitted July 20, 2001, and revised February 27, 2002, and April 23, 2002. Utah Division of Solid and Hazardous Waste Tracking Numbers 01.02407, 02.00680, and 02.01364. Revised for public comment and approved July 5, 2002

RCRA Mustard Agent Trial Burn for the Liquid Incinerators (LIC)

- Mustard Agent Trial Burn Plan, submitted December 21, 2005. Utah Division of Solid and Hazardous Waste Tracking Numbers 05.04058. Revised

RCRA Mustard Agent Trial Burn for the Metal Parts Furnace (MPF)

- Mustard Agent Trial Burn Plan, submitted December 21, 2005. Utah Division of Solid and Hazardous Waste Tracking Numbers 05.04058. Revised

Table D-5-1A LIQUID INCINERATOR #1 PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
1[a,b,c]	Agent Feed Rate to Primary Chamber13-FIT-127A13-FIT-127B	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 1,500 lb/hr	0 - 1275lb/hr
2[b,c]	Agent Feed Atomizing Air Pressure13-PIT-128	Diaphragm	Plant Air Line prior to Primary. Chamber Waste Feed Atomizing Nozzle	0 - 200 psig	60 - 75 psig
3[b,c]	Agent Gun Nozzle Pressure13-PIT-112	Diaphragm	Agent Line after Pump	0 - 25 psig	5 - 25 psig
4	Reserved				
5[b,c]	Primary Chamber Exhaust Gas Temp.13-TIT-610	Thermocouple	In-Line	212 - 3,000° F	2,550 - 2,850° F
6[b,c]	Secondary Chamber Spent Decon/Process Water Feed Rate 13-FIT-102	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 2,250 lbs/hr	0 - 1,920 lbs/hr.
7[d,e]	Secondary Chamber Spent Decon/Process Atomizing Air Press Waste Feed Interlock13-PSL-058	Diaphragm	Plant Air Line prior to Sec. Chamber Waste Feed Atomizing Nozzle	12 - 100 psig	Setpoint 60 psig
8[d,e]	Secondary Chamber Slag Gate Open Waste Feed Interlock13-ZS-367B	Limit Switch	Outside Bottom Secondary Chamber	Not Applicable	Not Applicable
9[b,c]	Secondary Chamber Exhaust Gas Temp. 13-TIT-129	Thermocouple	Incinerator Outlet	32 - 2,400° F	1,850-2,200° F
9.a[d,e]	Secondary Chamber Exhaust Gas Temp Low Gas Temperature Waste Feed Interlock13-TSLL-129	Current Switch	In-Line	4 - 20 mA	Setpoint 1,850° F
10[b,c]	Exhaust Gas Flow Rate24-FIT-9431A, 24-FIT-9431B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-103 outlet	1,477-14,765 acfm	10,200-14,000 acfm
10a[b,c]	V-Cone Pressure (STP pressure Correction) 24-FIT-9431	Diaphram	In-Line at packed bed scrubber PAS SCRB-103 outlet	8-13 psia	10-11 psia
10b[b,c]	V-Cone Temperature (STP Temperature Correction) 24-TIT-9431	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-103 outlet	100-200° F	140-180° F
11[b,c]	Quench Tower Exhaust Gas Temp.24-TIT-397	Thermocouple	In-Line	0 - 300° F	140 - 225° F
11.a[d,e]	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock24-TSHH-089	Filled System	In-Line	175 - 360° F	Setpoint 225° F
12[b,c]	Quench Brine Delivery Pressure 24-PIT-100	D/P Cell	In-Line	0 - 150 psig	40 - 150 psig
13[b,c]	Quench Brine to Venturi Scrubber24-FIT-088	Electro-Magnetic Flowmeter	In-Line	0 - 150 gpm	100 - 120 gpm
14[b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure24-PDIT-090	D/P Cell	Venturi Scrubber	0 –70in. w.c.	20 - 50 in. w.c.

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Table D-5-1A LIQUID INCINERATOR #1 PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
15[b,c]	Clean Liquor to Scrubber Tower Sprays24-FIT-112	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 – 800 gpm
16[b,c]	Clean Liquor Delivery Pressure 24-PIT-129	D/P Cell	In-Line	0 - 100 psig	25 - 100 psig
17[b,c]	Scrubber Brine pH24-AIT-091A[f]24-AIT-091B	Electrodes	Discharge From Pump 111/112	0 - 14 pH Units	7.0 - 11.0 pH
18[b,c]	Scrubber Brine Specific Gravity24-DIT-083	Magnetically Vibrated Tube	Pump-PAS-111/112 Disch	0.6 - 1.4 SGU	1.0 - 1.20 SGU
19[b,c,g,l]	Blower Exhaust Gas CO24-AIT-078	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 5,000 ppm	0-100 ppm, one hour rolling average, corrected to 7% O_2 dry volume.
20[b,c,g,l]	Blower Exhaust Gas CO13-AIT-083	Infrared Cell Analyzer	In-Line (Extractive)	0 - 200 & 0 - 5,000 ppm	0-100 ppm, one-hour rolling average, corrected to 7% O_2 dry volume.
21[b,c,l]	Blower Exhaust Gas $O_2$24-AIT-210	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
22[b,c,l]	Blower Exhaust Gas $O_2$13-AIT-229	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
23[e]	Blower Exhaust Gas AgentPAS 704H[h]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24[e]	Common Stack Exhaust Gas Agent PAS 701G[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24a[e]	Common Stack Exhaust Gas AgentPAS 706V[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24b[e]	Common Stack Exhaust Gas AgentPAS 707H[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
25[e]	All BRA-TANKS Filled Waste Feed Interlock23-LSHH-00223-LSHH-00623-LSHH-70223-LSHH-706	Sonic Level Switches	BRA-TANK-101BRA-TANK-102BRA-TANK-201BRA-TANK-202	Not Applicable	Not Applicable
26	Slag Removal System Shell13-TIT-374, 13-TIT-375, 13-TIT-376, 13-TIT-377	Thermocouple	In-Line	0-1000° F	70-500° F

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Table D-5-1A LIQUID INCINERATOR #1 PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range

Footnotes:
1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
* Calibration information is shown in Attachment 6.
[a] Reported value for agent feed rate is calculated by averaging the output of both mass flow transmitters.
[b] Continuous monitoring with values being recorded electronically, approximately every 15 seconds.
[c] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.
[d] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.
[e] Recorded upon activation or change in state of switch.
[f] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.
[g] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.
[h] PAS 704AH and PAS 704BH are the TAG IDs for the sampling location. One ACAMS is online at this location. A backup monitor is available if the primary monitor is taken offline. During Agent Trial Burn performance runs, two ACAMS will be on-line at all times during agent feed.
[i] PAS 701, PAS 706 and PAS 707are the TAG IDs for the sampling location. Two ACAMS are on-line with collocated DAAMS tubes at all times during agent operation for each agent.
[j] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or Mustard (H/HD/HT).
[k] SEL (Source Emission Limit)- Threshold values for the concentration of chemical agents in incinerator exhaust gases which have been established by the Surgeon General of the United States to protect human health and the environment. The SEL (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and Mustard (H/HD/HT) = 0.03.
[l] One monitor is required to be on-line at all times during waste feed. If more than one monitor is on-line both will report data to PDARS. All monitors on-line will be connected to a WFCO.

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Table D-5-2A
LIQUID INCINERATOR #1
AUTOMATIC WASTE FEED CUT-OFFS

Item No.	Tag Number	Process Data Description[C]	Setpoint[f]*
1.	13-FIC-127	Agent Feed Rate Greater Than or Equal to	≥ 1275 lb/hr Agent, one-hour rolling average
2	13-PAL-128	Agent Atomizing Air Pressure Less Than	< 60 psig
3	13-PALL-112B	Agent Feed Nozzle Pressure at High Feed Rate Less Than or Equal to	≤ 5 psig active 10 sec after LIC agent feed pump is started and at feed rates greater than 500 lbs/hr
4	Reserved		
5	13-TIT-610	Primary Chamber Temperature Less Than	< 2,500° F, one-hour rolling average
5.a	13-TAHH-610	Primary Chamber temperature Greater Than or Equal to	≥ 2,850° F
6.	13-FIC-102	Spent Decon Feed Rate Greater Than or Equal to	≥ 2100 lb/hr over one-hour rolling average
7	13-PSL-058	Spent Decon Atomizing Air Pressure Less Than or Equal to	≤ 60 psig
8	13-ZS-367B	Slag Removal System Discharge Gate Open	Upper Cylinder Switch Closed
9	13-TIT-129	Secondary Chamber Temperature Less Than	< 1,800° F, one-hour rolling average
9.a	13-TAHH-129	Secondary Chamber Temperature Greater Than or Equal to	≥ 2,200° F
10	24-FIT-9431	Exhaust Gas Flow Rate (Unit Production Rate) Greater Than or Equal to	9,500 scfm, one-hour rolling average
11	24-TSHH-089	Quench Tower Exhaust Gas Temperature Greater Than	> 225° F
12	24-PALL-100	Quench Brine Pressure Less Than or Equal to	≤ 40 psig
13	24-FIT-088	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 100 gpm one-hour rolling average
14	24-PDIT-090	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 30 in. w.c., one-hour rolling average
15	24-FIT-112	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 400 gpm, one-hour rolling average
16	24-PIT-129	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig, one-hour rolling average
17	24-AIT-091	Scrubber Brine to Venturi Scrubber pH Less Than to Equal to	≤ 7.0 pH, one-hour rolling average
18	24-DIC-083	Brine Specific Gravity Greater Than or Equal to	≥ 1.20 SGU, twelve-hour rolling average
19	24-AIT-078	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
20	13-AIT-083	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
21	24-AAL-210	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
21.a	24-AAH-210	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
22	13-AAL-229	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
22.a	13-AAH-229	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
23	PAS 704H	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[b,e]
24	PAS 701G	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
24a	PAS 706V	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
24b	PAS 707H	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
25	BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-002 and 23-LSHH-006 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level
26	13-TAHH-374, 13-TAHH-375, 13-TAHH-376, 13-TAHH-377	SRS Shell Thermocouple Temperature Greater Than or Equal to	≥ 500° F

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Table D-5-2A LIQUID INCINERATOR #1 AUTOMATIC WASTE FEED CUT-OFFS			
Item No.	Tag Number	Process Data Description[C]	Setpoint[f]*

Footnotes

* Waste feed cut-offs recorded upon switch activation.

[a] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.

[b] The alarm setting (in mg/m^3) for each agent is: GB =0.00006, VX =0.00015 and Mustard (H/HD/HT) = 0.006.

[c] Logic code description used to set the control WFCO alarms.

[d] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[e] In accordance with Condition 22.16.65.2 of the Agent Monitoring Plan for past agent, AWFCOs associated with GB and VX may be disabled if no wastes containing the agent are "inside the facility boundaries." This condition does not apply to the HVAC stack.

[f] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

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Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
1[a,b,c,d]	Agent Feed Rate to Primary Chamber 13-FIT-731A 13-FIT-731B	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 1,500 lb/hr	0 - 1275 lb/hr
2[b,c,d]	Agent Feed Atomizing Air Pressure 13-PIT-736	Diaphragm	Plant Air Line prior to Primary. Chamber Waste Feed Atomizing Nozzle	0 - 200 psig	60 - 75 psig
3[b,c,d]	Agent Gun Nozzle Pressure 13-PIT-760	Diaphragm	Agent Line after Pump	0 - 25 psig	5 - 25 psig
4	Reserved				
5[b,c,d]	Primary Chamber Exhaust Gas Temp. 13-TIT-710	Thermocouple	In-Line	212 - 3,000° F	2,550 -2,850° F
6[b,c,d]	Secondary Chamber Spent Decon/Process Water Feed Rate 13-FIT-763	Mass Flowmeter Vibrating U-Tube Type	In-Line	0 - 2,250 lbs/hr	0 - 1,920 lbs/hr.
7[d,e]	Secondary Chamber Spent Decon/Process Atomizing Air Press. Waste Feed Interlock 13-PSL-809	Diaphragm	Plant Air Line prior to Sec. Chamber Waste Feed Atomizing Nozzle	12 - 100 psig	Setpoint 60 psig
8[d,e]	Secondary Chamber Slag Gate Open Waste Feed Interlock 13-ZS-567B	Limit Switch	Outside Bottom Secondary Chamber	Not Applicable	Not Applicable
9[b,c,d]	Secondary Chamber Exhaust Gas Temp. 13-TIT-782	Thermocouple	Incinerator Outlet	32 - 2,400° F	1,850-2,200° F
9.a[d,e]	Secondary Chamber Exhaust Gas Temp. Low Gas Temperature Waste Feed Interlock 13-TSLL-782	Current Switch	In-Line	4 - 20 mA	Setpoint 1,850° F
10[b,c,d]	Secondary Chamber Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9902A, 24-FIT-9902B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-203 outlet	1,477-14,765 acfm	10,200-14,000 acfm
10a[b,c,d]	V-Cone Pressure (STP Pressure correction) 24-PIT-9902	Diaphram	In-Line at packed bed scrubber PAS-SCRB-203 outlet	8-13 psia	10-11 psia
10b[b,c,d]	V-Cone Temperature (STP temperature correction) 24-TIT-9902	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-203 outlet	100-200° F	140-180° F

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Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
11[b,c,d]	Quench Tower Exhaust Gas Temp. 24-TIT-816	Thermocouple	In-Line	0 - 300° F	140 - 225° F
11.a[d,e]	Quench Tower Exhaust Gas Temperature High Waste Feed Interlock 24-TSHH-800	Filled System	In-Line	175 - 360° F	Setpoint 225° F
12[b,c,d]	Quench Brine Delivery Pressure 24-PIT-838	D/P Cell	In-Line	0 - 150 psig	40 - 150 psig
13[b,c,d]	Quench Brine to Venturi Scrubber 24-FIT-828	Electro-Magnetic Flowmeter	In-Line	0 - 150 gpm	100 - 120 gpm
14[b,c,d]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-814	D/P Cell	Venturi Scrubber	0 –70in. w.c.	20 - 50 in. w.c.
15[b,c,d]	Clean Liquor to Scrubber Tower Sprays 24-FIT-825	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 - 800 gpm
16[b,c,d]	Clean Liquor Delivery Pressure 24-PIT-839	D/P Cell	In-Line	0 - 100 psig	25 – 100 psig
17[b,c,d]	Scrubber Brine pH 24-AIT-831A[f] 24-AIT-831B	Electrodes	Discharge From Pump 111/112	0 - 14 pH Units	7.0 - 11.0 pH
18[b,c,d]	Scrubber Brine Specific Gravity 24-DIT-835	Magnetically Vibrated Tube	Pump-PAS-111/112 Disch.	0.6 - 1.40 SGU	1.0 - 1.20 SGU
19[b,c,g,l]	Blower Exhaust Gas CO 24-AIT-716	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 5,000 ppm	0-100 ppm, one-hour rolling average, corrected to 7% O_2 dry volume.
20[b,c,g,l]	Blower Exhaust Gas CO 13-AIT-778	Infrared Cell Analyzer	In-Line (Extractive)	0 - 200 & 0 - 5,000 ppm	0-100 ppm, one-hour rolling average, corrected to 7% O_2 dry volume.
21[b,c,l]	Blower Exhaust Gas O_2 24-AIT-717	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
22[b,c,l]	Blower Exhaust Gas O_2 13-AIT-798	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0 - 25%	3 - 15%
23[e]	Blower Exhaust Gas Agent PAS 705H[h]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24[e]	Common Stack Exhaust Gas Agent PAS 701G[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24a	Common Stack Exhaust Gas Agent PAS 706V[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]
24a	Common Stack Exhaust Gas Agent PAS 707H[i]	ACAMS[j]	In-Line (Extractive)	0 - 512 SEL[k]	0 - 1.0 SEL[k]

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Table D-5-1B
LIQUID INCINERATOR #2
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device*	Location	Instrument Range	Expected Range
25[e]	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable
26	Slag Removal System Shell 13-TIT-574, 13-TIT-575, 13-TIT-576, 13-TIT-577	Thermocouple	In-Line	0-1000° F	70-500° F

Footnotes:
1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
* Calibration information is shown in Attachment 6.
[a] Reported value for agent feed rate is calculated by averaging the output of both mass flow transmitters.
[b] Continuous monitoring with values being recorded electronically, approximately every 15 seconds.
[c] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.
[d] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.
[e] Recorded upon activation or change in state of switch.
[f] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.
[g] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.
[h] PAS 705AH and PAS 705BH are the TAG IDs for the sampling location. One ACAMS is online at this location. A backup ACAMS is available if the primary monitor is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be on-line at all times during agent feed.
[i] PAS 701, PAS 706, and PAS 707 are the TAG IDs for the sampling location. Two ACAMS are on-line and collocated DAAMS tubes at all times during agent operations for each agent.
[j] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or Mustard (H/HD/HT).
SEL (Source Emission Limit)- Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The SEL (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and H/HD/HT = 0.03.
[l] One monitor is required to be on-line at all times during waste feed. If more than one monitor is on-line both will report data to PDARS. All monitors on-line will be connected to a WFCO.

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Table D-5-2B
LIQUID INCINERATOR #2
AUTOMATIC WASTE FEED CUT-OFFS

Item No.	Tag Number	Process Data Description[c]	Setpoint[f]*
1.	13-FIC-731	Agent Feed Rate Greater Than or Equal to	≥ 1,275444 lb/hr Agent, one hour rolling average
2	13-PAL-736	Agent Atomizing Air Pressure Less Than	< 60 psig
3	13-PALL-760B	Agent Feed Nozzle Pressure at High Feed Rate Less Than or Equal to	≤ 5 psig active 10 sec. after LIC feed pump is started and at feed rates greater than 500 lbs/hr
4		Reserved	
5	13-TIT-710	Primary Chamber Temperature Less Than	< 2,500° F, one-hour rolling average
5.a	13-TAHH-710	Primary Chamber temperature Greater Than or Equal to	≥ 2,850° F
6.	13-FIC-773	Spent Decon Feed Rate Greater Than or Equal to	≥ 2,100 lbs/hr, one-hour rolling average
7	13-PSL-809	Spent Decon Atomizing Air Pressure Less Than or Equal to	≤ 60 psig
8	13-ZS-567B	Slag Removal System Discharge Gate Open	Upper Cylinder Switch Closed
9	13-TIT-782	Secondary Chamber Temperature Less Than	< 1,800° F, one-hour rolling average
9.a	13-TAHH-782	Secondary Chamber Temperature Greater Than or Equal to	≥ 2,200° F
10	13-FIT-9902	Exhaust Gas Flow Rate (Unit Production Rate) Greater Than or Equal to	9,500 scfm, one-hour rolling average
11	24-TSHH-800	Quench Tower Exhaust Gas Temperature Greater Than	> 225° F
12	24-PALL-838	Quench Brine Pressure Less Than or Equal to	≤ 40 psig
13	24-FIT-828	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 100 gpm, one-hour rolling average
14	24-PDIT-814	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 30 in. w.c., one-hour rolling average
15	24-FIT-825	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 400 gpm, one-hour rolling average
16	24-PIT-839	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig
17	24-AIT-831	Scrubber Brine to Venturi Scrubber pH Less Than or Equal to	≤ 7.0 pH, one-hour rolling average
18	13-DIC-835	Brine Specific Gravity Greater Than or Equal to	≥ 1.20 SGU, twelve-hour rolling average
19	24-AIT-716	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
20	13-AIT-778	Blower Exhaust CO Concentration Greater Than or Equal to	≥ 100 ppm, one-hour rolling average, corrected to 7% O_2, dry volume[a]
21	24-AAL-717	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
21.a	24-AAH-717	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
22	13-AAL-798	Blower Exhaust Gas O_2 Less Than or Equal to	≤ 3% O_2
22.a	13-AAH-798	Blower Exhaust Gas O_2 Greater Than or Equal to	≥ 15% O_2
23	PAS 705H	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[b,]
24	PAS 701G	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
24a	PAS 706V	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
24b	PAS 707H	Common Stack Exhaust Agent Detect Greater Than or Equal to	≥ 0.2 SEL[b,d]
25	23-BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-002 and 23-LSHH-006 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level
26	13-TAHH-574, 13-TAHH-575, 13-TAHH-576, 13-TAHH-577	SRS Shell Thermocouple Temperature Greater Than or Equal To	≥ 500° F

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Table D-5-2B LIQUID INCINERATOR #2 AUTOMATIC WASTE FEED CUT-OFFS			
Item No.	Tag Number	Process Data Description[c]	Setpoint[f]*

Footnotes

* Waste feed cut-offs recorded upon switch activation

[a] One hour rolling average is composed of the 60 most recent one-minute averages. Each one-minute average is composed of the 4 most recent instantaneous CO process variables occurring at 15-second intervals.

[b] The alarm setting (in mg/m^3) for each agent is: GB =0.00006, VX =0.00015 and Mustard (H/HD/HT) = 0.006.

[c] Logic code description used to set the control WFCO alarms.

[d] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[e] In accordance with Condition 22.16.6.2 of the Agent Monitoring Plan for past agents, AWFCOs associated with GB and VX may be suspended if no wastes containing the agent are "inside the facility boundaries.

[f] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

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Table D-6-1
METAL PARTS FURNACE
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
1[a,b,c]	MPF Primary Chamber Temperature Zone 1 14-TIT-152[2] 14-TIT-391	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
2[a,b,c]	MPF Temperature Zone 2 14-TIT-141[2] 14-TIT-392	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
3[a,b,c]	MPF Primary Chamber Temperature Zone 3 14-TIT-153[2] 14-TIT-393	Thermocouple	Furnace	0-2,000° F	1,200 – 1,700° F
4[a,b]	MPF Primary Chamber Diff. Pressure 14-PIT-070	D/P Cell	Furnace	-10.0 - 0.0 in. w.c.	-6.0 to -4.0 in. w.c.
4.a.	MPF Primary Chamber Diff. Pressure High Waste Feed Interlock 14-PSHH-034	Current Switch	Furnace	- 10 - 0 in. w.c.	set point - 0.1 in. w.c.
5[a,b,c]	MPF Afterburner Temperature 14-TIT-065[2] 14-TIT-069	Thermocouple	Afterburner	32- 2,700° F	1,800 - 2,175° F
6[a,b,c]	MPF Afterburner Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9667A, 24-FIT-9667B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-101 outlet	1,494-14,942 acrm	10,000-14,000 acfm
6a[a,b,c]	V-Cone Pressure (STP Pressure Correction) 24-PIT-9667	Diaphragm	In-Line at packed bed scrubber PAS-SCRB-101 outlet	8-13 psia	10-11 psia
6b[a,b,c]	V-Cone Temperature (STP Temperature Correction)	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-101 outlet	100-200° F	140-180° F
7[a,b,c]	Quench Tower Exhaust Gas Temperature 24-TIT-509	Thermocouple	In-Line	0 - 300° F	140 - 225° F
7.a.[a,b,c]	Quench Tower Exhaust Gas Temp. High Waste Feed Interlock 24-TSHH-223	Filled System	In-Line	175 - 360° F	set point 225° F
8[a,b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-222	D/P Cell	Venturi Scrubber	0 – 50 in. w.c.	20 - 50 in. w.c.
9[a,b,c]	Quench Brine to Venturi Scrubber 24-FIT-218	Electro-Magnetic Flowmeter	In-Line	0 – 150 gpm	50 - 150 gpm
10[a,b,c]	Quench Brine Pressure 24-PIT-233	D/P Cell	In-Line	0 – 150 psig	70 – 140 psig
11[a,b,c]	Clean Liquor to Scrubber Tower Sprays 24-FIT-248	Electro-Magnetic Flowmeter	In-Line	0 - 1,000 gpm	400 – 900 gpm
12[a,b,c]	Clean Liquor Delivery Pressure 24-PIT-258	D/P Cell	In-Line	0 – 100 psig	25 – 100 psig

Table D-6-1
METAL PARTS FURNACE
PROCESS DATA[1]

Item No.	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
13[a,b,c]	Quench Brine Specific Gravity 24-DIT-216	Magnetically Vibrated Tube	Pump PAS Pump-102/103 Discharge	0.6 - 1.4 SGU	1.0 - 1.20 SGU
14[a,b,c]	Quench Brine pH 24-AIT-224A[d] 24-AIT-224B	Electrodes	Pump PAS-Pump-102/103 Discharge	0-14 pH Units	7-11 pH
15[a,b,c]	Blower Exhaust Gas CO 14-AIT-384	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0-5,000 ppm	0 – 100 ppm, one-hour rolling average.
16[a,b,c]	Blower Exhaust Gas CO 24-AIT-669	Infrared Cell Analyzer	Blower Exhaust Line (Extractive)	0 - 200 & 0 - 5,000 ppm	0 – 100 ppm, one-hour rolling average
17[a,b,c]	Blower Exhaust Gas O_2 14-AIT-082	Zirconium Oxide Cell Analyzer	Blower Exhaust Line (In-Situ)	0-25%	3 - 15%
18[a,b,c]	Blower Exhaust Gas O_2 24-AIT-670	Zirconium Oxide Cell Analyzer	Blower Exhaust Line (In-Situ)	0-25%	3 - 15%
19	Blower Exhaust Gas Agent PAS 703H, PAS 703G/V[e]	ACAMS[g]	In-Line (Extractive)	0 - 512 SEL[h]	0 - 1.0 SEL
20	Common Stack Exhaust Gas Agent PAS 701G[f]	ACAMS[g]	In-Line (Extractive)	0 - 512 SEL[h]	0 - 1.0 SEL
20a	PAS 706V	ACAMS[g]	In-Line (Extractive)	0 - 512 SEL[h]	0 - 1.0 SEL
20b	PAS 707H	ACAMS[g]	In-Line (Extractive)	0 - 512 SEL[h]	0 - 1.0 SEL
21	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable
22	Primary to Secondary Duct Temperature 14-TIT-010	Thermocouple	Duct	0- 2,282° F	1,800 - 2,282° F

Footnotes:

1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
2. Control loop corresponds to Tag. ID number. The controller averages the two transmitters if the outputs differ by less than 32 º F. The controller uses the lowest output if the transmitter outputs differ by more than 32 º F. Thermocouples fail high.

[a] Continuous monitoring with values being recorded electronically, approximately every 15 seconds
[b] Continuous recording every hour with the minimum and maximum values printed during one hour segment of operation.
[c] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.
[d] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.
[e] PAS 703AH, PAS 703BH and PAS 703C, PAS 703D are the TAG IDs for the sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary monitor is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be online at all times during agent feed.
[f] PAS 701, 706 an d 707 are the TAG IDs for the sampling location. Two ACAMS are online and collocated DAAMS tubes at all times during agent operations for each agent.
[g] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or H/HD/HT.
[h] SEL (Source Emission Limit)- Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The SEL (in mg/m³) for each agent is: GB =0.0003, VX =0.0003, and Mustard (H/HD/HT) = 0.03.
* Calibration information is shown in Attachment 6.

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Table D-6-2
METAL PARTS FURNACE SYSTEM
AUTOMATIC WASTE FEED CUTOFF

Item Number	Tag Number	Process Data Description	Setpoint[g,a]
1	14-TIT-152	Furnace Temperature Low-Low (Zone 1)	< 1,300° F
1.a.	14-TAHH-152	Furnace Temperature High-High (Zone 1)	> 1,800° F
2	14-TIT-141	Furnace Temperature Low-Low (Zone 2)	< 1,300° F
2.a.	14-TAHH-141	Furnace Temperature High-High (Zone 2)	> 1,800° F
3	14-TIT-153	Furnace Temperature Low-Low (Zone 3)	< 1,300° F
3.a.	14-TAHH-153	Furnace Temperature High-High (Zone 3)	> 1,800° F
4	14-PSHH-034	Primary Chamber Pressure High High	> -0.1 in. w.c., 5 Second Delay
5	14-IT-065	MPF Afterburner Temperature Low-Low	< 1,900° F, one-hour rolling average
5.a.	14-TAHH-065	Afterburner Temperature High-High	> 2175° F
6	24-FIT-9667	Afterburner Exhaust Gas Flow Rate (Unit Production Rate)	9,500 scfm, one-hour rolling average
7	24-TSHH- 223	Quench Tower Exhaust Gas Temperature High-High	> 225° F
8	24-PDIT-222	Venturi Exhaust Gas Pressure Drop Low-Low	≤ 20 in. w.c., one-hour rolling average
9	24-FIT-218	Brine to Venturi Scrubber Flow Low	< 85 gpm, one-hour rolling average
10	24-PALL-233	Quench Brine Pressure Low-Low	≤ 70 psig
11	24-FIT-248	Clean Liquor to Scrubber Tower Low-Low	≤ 400 gpm, one-hour rolling average
12	24-PIT-258	Clean Liquor Pressure Low-Low	≤ 35 psig, one-hour rolling average
13	624-DIC-216	Quench Brine Specific Gravity High-High	≥ 1.20 SGU, twelve rolling average
14	24-AIT-224	Brine to Venturi Scrubber pH Low	≤ 7.0 pH, one-hour rolling average
15	14-AIT-384	Blower Exhaust CO Concentration	≥ 100 ppm, one-hour rolling average. Corrected to 7%-O_2 dry volume[b]
16	24-AIT-669	Blower Exhaust CO Concentration	≥ 100 ppm, one-hour rolling average Corrected to 7%-O_2dry volume[b]
17	14-AAL-082	Blower Exhaust O_2 Low	≤ 3% O_2
17.a	14-AAH-082	Blower Exhaust O_2 High	≥ 15% O_2
18	24-AAL-670	Blower Exhaust O_2 Low	≤ 3% O_2
18.a	24-AAH-670	Blower Exhaust O_2 High	≥ 15% O_2
19	PAS 703GV and PAS 703H[f]	PAS Blower Exhaust Agent Detected	≥ 0.2 SEL for GB[e,e] ≥ 0.5 SEL for VX[e,e] ≥0.2 SEL for Mustard[e]
20	PAS 701G	Common Stack Exhaust Agent Detect	≥ 0.2 SEL[c,d]
20.a	PAS 706V	Common Stack Exhaust Agent Detect	≥ 0.2 SEL[c,d]
20.b	PAS 707H	Common Stack Exhaust Agent Detect	≥ 0.2 SEL[c,d]
21	23-BRA-TNKS	Brine Surge Tanks 101, 102, 201, 202, Four Levels High-High (BRA-TNKS = 23-LSHH-02 and 23-LSHH-06 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level

Footnotes:

[a] Waste feed cut-offs are activated and recorded by PDARS when the associated set point is equaled or exceeded.

[b] One hour rolling average is composed of the 60 most recent one minute averages. Each one-minute average is composed of 4 most recent instantaneous CO process variables, which occur at 15-second intervals.

[c] The alarm settings (in mg/m3) for each agent are: GB=0.00006, VX=0.000015 and Mustard (H/HD/HT)=0.006.

[d] An Automatic WFCO occurs if the two online ACAMS are not staggered so that at least one unit is sampling the stack.

[e] In accordance with Condition 22.16.6.2 of the Agent Monitoring Plan for past agent AWFCOs associated with GB and VX may be suspended if no wastes containing the agent are "inside the facility boundaries.".

[f] PAS 703AV, PAS 703BV and PAS 703CG, PAS 703DG are the TAG IDs for this sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline.

[g] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

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Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
1	Jammed Chute Line A Waste Feed Interlock 16-XS-207	Radioactive Proximity Switch	Feed Chute DFS Kiln Room	On-Off	Not Applicable
2	Jammed Chute Line B Waste Feed Interlock 16-XS-209	Radioactive Proximity Switch	Feed Chute DFS Kiln Room	On-Off	Not Applicable
3	Agent Feed Rate Agent Quantification System RSM-101 51-LIT-051	DP Level Indicating/transmitter	Explosive Containment Room A	0 to 30 in. W.C.	7.0 to 15.2 in. W.C.
3.a	Agent Feed Rate Agent Quantification System RSM-102 51-LIT-057	DP Level Indicating/transmitter	Explosive Containment Room B	0 to 30 in. W.C.	7.0 to 15.2 in. W.C.
4.a	Rocket Feed Rate RSM-101 & RSM-102	DFS Process Control Software	Not Applicable	Not Applicable	0 - 33 rockets/hr
4.b	Propellant, Explosive, and Pyrotechnic (PEP) Feed Rate	DFS Process Control Software	Not Applicable	Not Applicable	0 - 743.4 lb/hr
4.c[k]	Simultaneous Processing Feed Rate	DFS Process Control Software	Not Applicable	Not Applicable	0 - 1 rockets/hr 0 - 125.8 lb PEP per hour
5	Kiln Rotational Speed Calculated from 16-ZX-602	Proximity Switch	Kiln Exterior	Not Applicable	0.33 to 2.0 rpm
6	Kiln Speed Low Waste Feed Interlock 16-SALL-602	Speed (proximity) Switch	Kiln Exterior	Not Applicable	set point 0.33 rpm
7[a,b]	Kiln Pressure 16-PIT-018	Diaphragm	Furnace	-2.0 to 1.0 in. w.c.	-0.1 to -2.0 in. w.c.
7.a	Kiln Pressure High Waste Feed Interlock 16-PSHH-204	Diaphragm	Furnace	-0.5 to 0.5 in. w.c.	set point -0.1 in. w.c.
8[af,b,c]	Kiln Exhaust Temp. Pre Quench 16-TIT-182 16-TIT-244[d]	Thermocouple	Furnace	0 - 2,300° F	950-1,750° F
9[a,b,c]	Kiln Exhaust Temp. Post Quench 16-TIT-008 16-TIT-169[d]	Thermocouple	Kiln Exhaust Gas Duct	0 - 2,300° F	850- 1,650° F
10[a,b,c]	Discharge Conveyor Temperature (lower) 16-TIT-042	Thermocouple	Conveyor	0 -1,600° F	1,000-1,300° F
11[a,b,c]	Discharge Conveyor Temperature (upper) 16-TIT-184	Thermocouple	Conveyor	0 -1,600° F	1,000-1,300° F
12	Discharge Conveyor Tip Gate Jam Waste Feed Interlock 16-XS-058	Radioactive Limit Switch	Upper Discharge Conveyor Gate	Not Applicable	Not Applicable
13	Discharge Conveyor Slide Gate Jam Waste Feed Interlock 16-XS-821	Radioactive Limit Switch	Lower Discharge Conveyor Gate	Not Applicable	Not Applicable
14	Discharge Conveyor Speed Low Waste Feed Interlock 16-SSL-057	Speed (Proximity) Switch	Discharge Conveyor Tail Shaft	On-Off	set point zero speed

Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
15[a,b,c]	Exhaust Gas Afterburner 16-TIT-092 16-TIT-003[d]	Thermocouple	In-Line	0-2,400° F	2,050-2,350° F
16[a,b,c]	Afterburner Exhaust Gas Flow Rate (Unit Production Rate) 24-FIT-9430A, 24-FIT-9430B	V-Cone	In-Line at packed bed scrubber PAS-SCRB-102 outlet	3,818-38,126 acfm	25,000-30,000 acfm
16a[a,b,c]	V-Cone Pressure (STP pressure correction) 24-PIT-9430	Diaphragm	In-Line at packed bed scrubber PAS-SCRB-102 outlet	8-13 psia	10-11 psia
16b[a,b,c]	V-Cone Temperature (STP Temperature correction) 24-TIT-9430	Thermocouple	In-Line at packed bed scrubber PAS-SCRB-102 outlet	100-200° F	140-180° F
17[a,b,c]	Quench Tower Exhaust Gas Temp 24-TIT-374	Thermocouple	In-Line	0-300° F	140-200° F
17.a	Quench Tower Exhaust Gas High Temp Waste Feed Interlock 24-TSHH-001	Filled System	In-Line	175-360° F	Set point 200° F
18[a,b,c]	Quench Brine Specific Gravity 24-DIT-033	Magnetically Vibrated Tube	PAS Pump 106/107 Discharge	0.6 - 1.40 SGU	1.0- 1.20 SGU
19[a,b,c]	Quench Brine pH 24-AIT-007A[e] 24-AIT-007B	Electrode	PAS Pump 106/107 Discharge	0-14 pH Units	7-11 pH Units
20[a,b,c]	Quench Brine Pressure 24-PIT-011	Diaphragm	In-Line	0-200 psig	75-200 psig
21[a,b,c]	Quench Brine to Venturi Scrubber 24-FIT-006	Electro-magnetic Flowmeter	In-Line	0-400 GPM	300-400 GPM
22[a,b,c]	Venturi Scrubber Exhaust Gas Diff. Pressure 24-PDIT-008	D/P Cell	Venturi Scrubber	0-50 in. w.c.	20-50 in. w.c.
23[a,b,c]	Clean Liquor to Scrubber Tower Sprays 24-FIT-030	Electro-magnetic Flowmeter	In-Line	0-3,000 GPM	750 - 2,400 GPM
24[a,b,c]	Clean Liquor Pressure 24-PIT-036	Diaphragm	In-Line	0-100 psi	30-100 psig
25[a,b,c]	Blower Exhaust Gas O_2 24-AIT-206	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0-25%	3-15%
26[a,b,c]	Blower Exhaust Gas O_2 16-AIT-175	Zirconium Oxide Cell Analyzer	In-Line (Extractive)	0-25%	3-15%
27[a,b,c]	Blower Exhaust Gas CO 24-AIT-207	Infrared Cell Analyzer	In-Line (Extractive)	0-200 & 0-5,000 ppm	0 – 100 ppm
28[a,b,c]	Blower Exhaust Gas CO 16-AIT-059	Infrared Cell Analyzer	In-Line (Extractive)	0-200 & 0-5,000 ppm	0 – 100 ppm
29[a,b,c]	Blower Exhaust Gas Agent PAS 702H and 702G/V[g]	ACAMS[i]	In-Line (Extractive)	0-512 SEL[j]	0- 1.0 SEL
30	Common Stack Exhaust Gas Agent PAS 701G[h]	ACAMS[i]	In-Line (Extractive)	0-512 SEL[j]	0- 1.0 SEL

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Table D-7-1
DEACTIVATION FURNACE SYSTEM
PROCESS DATA[1]

Item No	Control Parameter	Measuring Device	Location	Instrument Range	Expected Range
30a	Common Stack Exhaust Gas Agent PAS 706V[h]	ACAMS[i]	In-Line (Extractive)	0-512 SEL[j]	0- 1.0 SEL
30b	Common Stack Exhaust Gas Agent PAS 707H [h]	ACAMS[i]	In-Line (Extractive)	0-512 SEL[j]	0- 1.0 SEL
31	All BRA-TANKS Filled Waste Feed Interlock 23-LSHH-002 23-LSHH-006 23-LSHH-702 23-LSHH-706	Sonic Level Switches	BRA-TANK-101 BRA-TANK-102 BRA-TANK-201 BRA-TANK-202	Not Applicable	Not Applicable

Footnotes:

1. QA/QC procedures are found in Attachment 3 (Sampling, Analytical, and QA/QC Procedures).
[a] Continuous Monitoring with values being recorded electronically, approximately every 30 seconds.
[b] Continuous Recording every hour with the minimum and maximum values printed during one hour segment of operation.
[c] Maintenance, at a minimum, in accordance with equipment manufacturer's recommendations.
[d] Control loop number corresponds to bolded Tag ID. Controller algorithms manipulate the output of both transmitters to determine the process variable as follows:

The controller averages the output of both transmitters, if the transmitter outputs differ by less than 32° F.

The controller uses the transmitter with the highest output, if the transmitter outputs differ by greater than 32° F and the associated waste feed interlock is activated when the temperature becomes greater than the set point value.

The controller uses the transmitter with the lowest output, if the transmitter outputs differ by greater than 32° F and the associated waste feed when the temperature becomes less than the set point value.

The controller uses the transmitter with the lowest output, if the transmitter outputs differ by greater than 32° F and the high transmitter's output is at full scale (i.e., 20 milliamps, or maximum instrument range).

[e] Only one analyzer active at any one time. The active analyzer provides the process variable to the controller. The Permittee shall attempt to balance the usage time of each analyzer.
[f] Reserved.
[g] PAS 702AH, PAS 702BH and PAS 702C, PAS 702D are the TAG IDs for the sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline. During Agent Trial Burn performance runs only, two ACAMS will be online at all times during agent operations.
[h] PAS 701, PAS 706 and PAS 707are the TAG IDs for the sampling location. Two ACAMS are online and collocated DAAMS tubes at all times during agent operations for each agent.
[i] ACAMS (Automatic Continuous Air Monitoring System) - ACAMS are portable gas chromatographs configured to detect airborne concentrations of agents GB, VX, or Mustard (H/HD/HT).
[j] SEL (Source Emission Limit) - Threshold values for chemical agent emissions rates that have been established by the Surgeon General of the United States to protect human health and the environment. The SEL (in mg/m^3) for each agent is: GB =0.0003, VX =0.0003, and Mustard = 0.03.
[k] Only required when simultaneously processing GB rockets and GB projectiles in the DFS.
* Calibration information is shown in Attachment 6.

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Table D-7-2
DEACTIVATION FURNACE SYSTEM
AUTOMATIC WASTE FEED CUT-OFFS[1]

Item No.	Tag Number	Kiln [g]Rotation	Process Data Description [f]	Set point[k]
1	16-XS-207	3	Jammed Chute Line A	Feed Chute Filled 10 second delay
2	16-XS-209	3	Jammed Chute Line B	Feed Chute Filled 10 second delay
3	WFR-1HR-DFS	3	Agent Feed Rate Limit	> 9.1 lbs/hr[a]
4.a	DFS-RKFDRT	3	Rocket Feed Rate Limit	> 33 rockets/hr[b]
4.b	PEP-1HR-DFS	3	Propellant, Explosives, and Pyrotechnics (PEP) Feed Greater Than	> 359 lb PEP/hr
4.c[i]	DFS-RKFDRT DFS-PJFDRT DFS-AQS-FDRT	3	Simultaneous Processing Feed Rates Greater Than Either	> 1 rocket/hr or > 125.8 lb PEP/hr or > 10.7 lb/hr (agent)
5	16-SAHH-602	4	Kiln Speed (rpm) Greater Than or Equal to	≥ 2 RPM
6	16-SALL-602	2	Kiln Rotation Less Than or Equal to	≤ 0.33 RPM
7	16-PSHH-204	3	Kiln Combustion Chamber Pressure: Greater Than	> -0.1 in. w.c.
8	16-TIT-182	4	Kiln Exhaust Gas Pre Quench Temperature Less Than or Equal to	≤ 954° F, one-hour rolling average
9	16-TAHH-008	3	Kiln Exhaust Gas Post Quench Temperature Greater Than	> 1,650° F
10	16-TALL-042	5	Lower Heated Discharge Conveyor Temperature Less Than or Equal to	≤ 1,000° F
11	16-TALL-184	5	Upper Heated Discharge Conveyor Temperature Less Than or Equal to	≤ 1,000° F
12	16-XS-058	5	Jam in Discharge Conveyor	Discharge Chute Filled 10 second delay
13	16-XS-821	5	Jam in Discharge Conveyor	Discharge Chute Filled 10 second delay
14	16-SSL-057	5	No Motion on Heated Discharge Conveyor	No Motion
15	16-TIT-092	3	Afterburner Temperature Less Than or Equal to	≤ 2065° F, one-hour rolling average
15.a	16-TAHH-092	3	Afterburner Temperature Greater Than or Equal to	≥ 2350° F
16	24-FIT-9430	3	Exhaust Gas Flow Rate (Unit Production Rate) Greater Than or Equal to	≥ 13,210 scfm, one-hour rolling average
17	24-TSHH-001	3	Quench Tower Exhaust Gas Temperature Greater Than	> 200° F
18	24-DIC-033	3	Quench Brine Specific Gravity Greater Than or Equal to	≥ 1.10 SGU, twelve-hour rolling average
19	24-AIT-007	3	Brine to Venturi Scrubber pH Less Than or Equal to	≤ 8.7 pH, one-hour rolling average
20	24-PALL-011	3	Quench Brine Pressure Less Than or Equal to	≤ 75 psig
21	24-FIT-006	3	Brine to Venturi Scrubber Flow Less Than or Equal to	≤ 310 gpm, one-hour rolling average
22	24-PDIT-008	3	Venturi Exhaust Gas Pressure Drop Less Than or Equal to	≤ 30 in. w.c., one-hour rolling average
23	24-FIT-030	3	Clean Liquor to Scrubber Tower Less Than or Equal to	≤ 800 gpm, one-hour rolling average
24	24-PIT-036	3	Clean Liquor Pressure Less Than or Equal to	≤ 35 psig, one-hour rolling average
25	24-AAH-206	3	PAS Blower Exhaust O_2 Greater Than or Equal to	≥ 15% O_2
25.a	24-AAL-206	3	PAS Blower Exhaust O_2 Less Than or Equal to	≤ 3% O_2
26	16-AAH-175	3	PAS Blower Exhaust O_2 Greater Than or Equal to	≥ 15% O_2
26.a	16-AAL-175	3	PAS Blower Exhaust O_2 Less Than or Equal to	≤ 3% O_2
27	24-AIT-207	3	PAS Blower Exhaust CO Greater Than or Equal to	≥ 100 ppm, one-hour rolling average [c]
28	16-AIT-059	3	PAS Blower Exhaust CO Greater Than or Equal to	≥ 100 ppm, one-hour rolling average[c]
29	PAS 702H and 702G/V	3	PAS Blower Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[d] for GB, ≥ 0.2 SEL for Mustard and ≥0.5 SEL VX[d]

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Table D-7-2
DEACTIVATION FURNACE SYSTEM
AUTOMATIC WASTE FEED CUT-OFFS[1]

Item No.	Tag Number	Kiln [g]Rotation	Process Data Description [f]	Set point[k]
30	PAS 701G	3	Common Stack Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[e,h]
30a	PAS 706V	3	Common Stack Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[e,h]
30b	PAS 707H	3	Common Stack Exhaust Agent Detected Greater Than or Equal to	≥ 0.2 SEL[e,h]
31	23-BRA-TNKS	3	Brine Surge Tanks 101,102,201,202,Four Levels High-High (BRA-TNKS = 23-LSHH-02 and 23-LSHH-06 and 23-LSHH-702 and 23-LSHH-706)	18'3" Level

Footnotes:

[1] Line A and B feed gates may be manually cycled once after a waste feed cut-off alarm is activated providing the primary and secondary combustion temperatures are above the minimum permit limits. This manual operation will be used to clear any partially treated (chopped) energetic components from the outer surfaces of the gates.

[a] The agent feed rate waste feed cutoff is activated when the rolling hourly sum of each difference calculated between the "as manufactured" rocket agent fill volume minus the volume drained from each rocket (as determined by the Agent Quantification System) exceeds 17.0 pounds per hour.

[b] The rocket feed rate waste feed cutoff is activated when the rolling hourly sum of rockets fed to the DFS exceeds 33 rockets per hour.

[c] One hour rolling average is composed of the 60 most recent one minute averages. Each one-minute average is composed of 4 instantaneous CO process variables, which occurred at 15-second intervals.

d In accordance with Condition 22.16.2 of the Agent Monitoring Plan for past agents, AWFCOs associated with GB and VX may be suspended if no wastes containing the agent are "inside the facility boundaries."

[e] The alarm settings (in mg/m^3) for each agent are: GB =0.00006, VX =0.00006, and H/HD/HT = 0.006.

[f.] Logic code description used to set the control WFCO alarms.

[g.] Kiln rotation and HDC motion during a waste cut-off will be as follows:

2. HDC motion shall be maintained when waste feed cut-off is activated.
3. Kiln rotation and HDC motion are maintained when waste feed cut-off is activated.
4. Kiln oscillates and HDC motion is maintained when waste feed cut-off is activated.
5. Kiln oscillates and HDC motion stops when waste feed cut-off is activated.

[h] An Automatic WFCO occurs if the two on-line ACAMS are not staggered so that at least one unit is sampling the stack.

[i] Only required when simultaneously processing GB rockets and GB projectiles in the DFS.

[j] PAS 702AH, PAS 702BH and PAS 702C, PAS 702D are the TAG IDs for this sampling location. One ACAMS is online for each agent at this location. A backup ACAMS is available for each agent if the primary ACAMS is taken offline.

[k.] Rolling average means the average of all one-minute average over the averaging period. A one-minute average means the average of detector responses calculated at least every 60 seconds from responses obtained at least every 15 seconds

Deleted: The alarm setting (in mg/m^3) for VX agent is 0.00015.¶

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